DOCUMENT RESUME

ED 436 961 FL 026 073

AUTHOR	Boy, Nancy Omaha, Ed.
TITLE	The Journal of Accelerated Learning and Teaching, 1998.
INSTITUTION	International Alliance for Learning, Oceanside, CA.
ISSN	ISSN-0273-2459
PUB DATE	1998-00-00
NOTE	123p.
AVAILABLE FROM	IAL Journal/JALT, 1040 South Coast Highway, Encinitas, CA 92024 ($30 per year, U.S., Canada, and Mexico; $60 per year, others).
PUB TYPE	Collected Works - Serials (022)
JOURNAL CIT	Journal of Accelerated Learning and Teaching; v23 n1-4 Spr-Fall 1998
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Acceleration (Education); Adult Education; *Cognitive Ability; Computer Assisted Instruction; Hearing Impairments; Learning Strategies; Mathematics Achievement; Multiple Intelligences; Music; Reading Achievement; Teaching Methods; Test Anxiety; Writing Processes

ABSTRACT

This document comprises the entire output for the journal for 1998. The first article is in the form of a modified excerpt from an article by Donna I. Ali of the University of Calgary on "Multiple Intelligences and the Writing Process: Some Implications for Teaching." The article investigates why writing is difficult for some and easy for others, and why the different ways that students process information (have different composing styles) is important to understanding which teaching methods work. The second article is a book review of "The Mozart Effect," a book by Don Campbell. This article discusses how music, specifically that of Mozart and Gregorian chants, is therapeutic for people who suffer from hearing and listening disorders. "Cognitive Skills and Accelerated Learning Memory Training Using Interactive Media Improves Academic Performance in Reading and Math," documents that the effects of former successful applications of accelerated learning, memory, and cognitive skills interactive media training can be replicated in multiple classrooms, thereby validating the applicability of accelerated learning practices. "Reducing Test Anxiety by a Combination of Hypnosis and NLP," argues by way of a case study that a combination of hypnotic induction and Neuro-Linguistic Programming (NLP) can significantly reduce test anxiety. (Each article contains references.) (KFT)

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ED 436 961

The Journal of Accelerated Learning and Teaching

Volume 23 Numbers 1-4
Spring-Fall 1998

Nancy Omaha Boy, Editor

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THE JOURNAL OF ACCELERATED LEARNING AND TEACHING

Volume 23, Issue 1 & 2 Spring, 1998

Published by the International Alliance for Learning, Inc.
ISSN 0273-2459

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Journal of Accelerated Learning and Teaching

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JALT ON THE INTERNET
http://TEC.camden.rutgers.edu/JALT

Journal of Accelerated Learning and Teaching
Volume 23, Issue 1 & 2 Spring, 1998

A Modified Excerpt From: Multiple Intelligences and the Writing Process: Some Implications for Teaching

Donna I. Ali
University of Calgary

The act of composing written text is an art to some, a science to others and perhaps a mystery to the rest of us. Some writers write with ease, the words simply flowing out, while others write with great difficulty and see writing as a painful process; still other writers fall somewhere in-between. Composition teachers have long been armed with their theory and methods to teach writing—and yet, some students simply do not get it. Why?

Firstly, composition theorists began by assuming that students process information the same way, and therefore they assumed that the same method would work for all students. (If students do not think the same way, however, it follows then that the same method though tried and true for some, will not work for every student.) Composition theory evolved from this limited view of one composing style to acknowledging that there are several ways of composing. For instance, Tucker (1995) comments that, "To writers, composing styles are convenient tactics for negotiating the river of language. For writing teachers, they are windows into minds that may not work like our own." (p 30).

The above quote flags two distinct yet intertwined areas: composing styles of students and techniques for teaching composition. Tucker suggests that composing styles are "tactics" for "negotiating" language. These styles vary from student to student. As Flower and Hayes (1981) suggest, some students have extensive revision processes, while others write only one draft and then go straight to the final product. Some students diligently make outlines while others work everything out "in their head." Similarly, from the instructor's perspective, many instructors assume that students will learn to write the same way they did, so they teach the composition method that they were taught.

The above quote also encapsulates some of the questions we have regarding the composing process. How do students approach writing? What goes on in their minds? What composing styles do they use? This study will first look at the evolution of composition theory and then introduce the theory of multiple intelligences developed by Dr. Howard Gardner. This cognitively-based theory from the field of psychology has educational applications and may lend further insight into the composing process.

Due to space limitations, the section on the evolution of composition theory has been omitted. Let us turn instead to the application of the theory of multiple intelligences to the composing process.

Applying the Theory of Multiple Intelligences to the Composing Process

To begin to answer some of the earlier questions posed such as, "how do students approach writing?" it would seem that the cognitive/social approach to studying composition which is a blend of the cognitive and social approaches is an appropriate lens through which we can study the composing process in greater detail. This approach focuses on the mental processes taking place inside the mind of the writer (the cognitive approach), while at the same time recognizing that these processes are heavily influenced by social and cultural factors (the social approach).

With respect to individual learning differences, Dr. Howard Gardner's theory of multiple intelligences makes a significant addition to the study of writing precisely because it is a cognitively-based theory of psychology that suggests that there are other ways of processing information besides the "normal" logical/mathematical and verbal/linguistic ways—which are given high priority—due to the emphasis on linear rationality in academic spheres.

Howard Gardner, professor of cognitive psychology agrees with other researchers in the field of intelligence that intelligence should be studied in context (i.e. as people are solving problems); however, he challenges the traditionally held view that all people posses a "general" intelligence that can be measured quantitatively. He argues that intelligence is not a single capacity, the quality of which is determined at birth. Since standardized school testing focuses solely on capturing the linguistic and logical/mathematical intelligences, students with strengths in other forms of intelligence clearly have had no opportunity to exhibit these strengths.

In Frames of Mind (1983) and Multiple Intelligences: the Theory in Practice (1993), Gardner offers a more pluralistic view of the cognitive universe. After extensive research on the developmental skills of normal children, brain damaged patients, prodigies, children with learning disabilities and several other specialized populations, he proposes that people have at least seven distinct intelligences that work in concert with one another, each person having a unique blend of these intelligences. Gardner maintains that no one can state a definitive number of intelligences. The seven he lists are the results of his research: (1) musical; (2) bodily/kinesthetic; (3) logical/mathematical; (4) linguistic; (5) spatial; (6) interpersonal; (7) intrapersonal.

The seven intelligences (and Gardner stresses that this is not, nor can there be a definitive list), are discussed separately in order to describe them, yet Gardner makes it clear that these intelligences blend and work together in normal individuals. In addition, Gardner explains that what is valued most in North American schools is logical/mathematical and linguistic types of intelligence, since that is precisely what is tested via standardized testing. Since standardized testing focuses exclusively on these two intelligences, students who exhibit strengths in other forms of intelligence are not recognized for their accomplishments.

Gardner claims that the overriding bias in North American schools toward logical/mathematical and linguistic types of expression denies the almost obvious other forms of intelligence that people use in their day-to-day lives, whether they are solving problems or producing products—activities that are highly valued in cultural terms. Additionally, Gardner accounts for the effects of social and cultural factors in the theory of multiple intelligences (hereafter referred to as MI theory); he suggests that a person's experience and interactions with their particular culture influence the extent to which each intelligence is expressed.

Gardner's theory has tremendous educational implications for the learner and the teacher; his theory suggests that individuals think differently and therefore learn differently. Similarly, research in the area of education known as "learning styles" also supports this claim (Reiff, 1992, cited in Gage, 1995).

It should be noted here that (although first published in 1983) MI theory has not been widely applied to the study of writing and how writing is taught. Gerald

Grow (1995) suggests that since MI theory offers a window to the complexities of the human mind, it is worth noting how it interacts with the writing process, which Grow describes as requiring a "blend of several distinct human capacities" (p 3). Grow's article takes each of the seven intelligences in isolation and discusses how writers might employ that intelligence to help them write. He does not, however, discuss composing styles or composing processes, which is the greater focus of this study.

Framing the Question

Composition research suggests that the composing process varies between writers (see Flower and Hayes, 1980, 1981, 1983, 1986). Gardner's theory of multiple intelligences suggests that people learn differently (i.e. there are individual learning differences). Those differences are reflected in the degree of development of each person's multiple intelligences. The questions this study asks then are:

Is there a connection between students' composing styles and their cognitive profiles?

Do students who use similar composing styles (or strategies) have similarities in various aspects of their cognitive profile?

Does the knowledge of a student's cognitive profile (reflected in this case by the level of development of each of the multiple intelligences), in addition to the student's composing style enhance our ability to teach writing, especially to those students who are having difficulty?

Will the application of MI theory to the writing process shape a more informed method of teaching writing that focuses on the individual writer/learner?

If we apply MI theory to writing, our larger question is:

What information can writing instructors gain that will assist them in helping students find composing strategies that work with the students rather than against them?

Significance of the Study

It is clear that teachers need, by nature of the job, to figure out various ways to assist students in the writing process. If we recognize the link between the writing processes and multiple intelligences, we will be better able to validate diverse processes. Furthermore, this study is suggesting that knowing a student's cognitive profile will better enable a teacher to make specific suggestions to enhance the writing experience for each student. In this study, I will make a preliminary attempt to discover the relationships between composing styles and cognitive styles. This information, in turn, will allow me to suggest some ways of taking advantage of these connections and suggesting interventions a writing instructor might use to assist students with varying cognitive profiles to find composing strategies that work for them. This is especially significant in situations where the students' composing styles are not working to their advantage. Composition teachers and anyone involved in teaching others how to communicate via the written word will find this study of interest.

It should be noted that this is a preliminary study only and the findings of this research will consist of suggestive connections, not statistical correlations. It is hoped that this study will be perhaps a starting point for others who wish to conduct more in depth qualitative and quantitative research in this area.

Before proceeding, let us take a closer look at how the act of composing and writing *might* involve the seven intelligences. While the following section is highly speculative, it is useful to note how each of the intelligences may be called upon and employed as a writer writes.

Multiple Intelligences and the Composing Process

Let us begin with the linguistic intelligence. This intelligence is clearly one of the most important intelligences called upon by students to write an assignment; in sum, it involves the mastery of words.

Students call upon logical/mathematical intelligence to make a logical argument and to establish a logical progression of ideas for the reader to follow. The visual/spatial intelligence is utilized by those who "see" or "visualize" their paper or sections of their paper and can perhaps perform mental changes and edits. Also, some students need to "map out" or "draw out" their paper in order to write. Others have a very strong image in their minds of what they are going to write about in every section of their paper—before they write a word.

Kinesthetic intelligence is connected to the fine motor skills necessary to write or type. In addition, some students write on cue cards and arrange and rearrange sections of their paper "physically", while others may "cut and paste" pieces of paper (with various ideas, quotes or research information) onto a piece of bristol board, for example. (As a side note, I believe that students engage in "cut and paste" activities and use cue cards less and less due to computer technology.)

Interpersonal intelligence is called upon when writers are sensitive to the needs and expectations of their audience. For example, writers could change their tone, content or general writing "style" to satisfy their audience. Intrapersonal intelligence, on the other hand, manifests as writers' sensitivity to their own feelings and views and the corresponding ability to express this in written form. For example, does the writer engage in introspection and self-examination? Many writers exercise their intrapersonal intelligence by keeping a journal.

And finally, the musical intelligence is called upon to some extent, when a writer is sensitive to the sound of words—for example, how they rhyme. There is often a beautiful musical quality to the words of what is considered to be "good" poetry.

Methodology Employed in this Study

This methodology has been formulated so as to get at subjects' underlying preferences with respect to writing. For example, are they satisfied with the way they presently write (their own composing process)? Are they having difficulties? If yes, in what areas? To echo the larger set of research questions guiding this study, is there any connection between both students' composing style and the choices they make and their cognitive profile (as measured by the Multiple Intelligences Development Assessment Scales (MIDAS), an MI assessment instrument)? Even more importantly, how does the knowledge of a student's cognitive profile help both the writing instructor/teacher and the student gain a better understanding of how to enhance the writing process? Let us now turn our attention to the methodology that will be used.

Under the broad umbrella of "composition methodology," I have chosen to use two *retrospective accounts* to study the composing process. A *retrospective account* is a report "after the fact"(that is, after the writing has occurred). It allows the subjects to reflect on their choices and to explore the reasons behind those choices. After writing an article for submission to a magazine, students will be asked to: 1) write a journal report and 2) attend an interview. In a limited sense, I will also be using a composition methodology referred to as *stimulated recall* since each student will have access to their original article during the interview. Both the journal report and the interview are useful ways of stimulating discussion and probing for connections to various intelligences. The specific methodology of this study will consist of the following:

1. Selection of Subjects

Students will be selected from a university course entitled "Heritage," General Studies 300. This is a survey course of culture and values of Western civilization from Gilgamesh to the Enlightenment. This course was chosen because students enrolled in this course come from a variety of academic disciplines and backgrounds, as opposed to a specialized discipline such as Engineering or Music. Therefore, I am less likely to find a narrow range of cognitive styles.

I have chosen to use a small sample size (ten students) and have thereby elected to trade off statistical reliability in order to get a more in depth look at composing styles. I am not looking for "proof" of a connection between composing styles and strengths/weaknesses in various intelligences, but rather a suggestion of a connection, that may have a bearing on the instruction of writing and therefore, may be worth pursuing in future studies.

2. Multiple Intelligence Assessment Scales (MIDAS)

Students' cognitive profiles will be assessed using MIDAS. This instrument was chosen partly because it was recommended by Dr. Howard Gardner and partly because there are very few MI assessment tools available. The MIDAS, designed by Branton Shearer, Ph.D., is based on the theory of multiple intelligences as expounded by Dr. Howard Gardner and attempts to provide an objective measure of a person's multiple intelligences. According to Dr. Shearer, "MIDAS results are offered back to the person not as hard and unchanging truth but rather as useful hypotheses for appraisal, elaboration and action planning" (1996, p. 1).

The MIDAS profile provides "a reasonable estimate" of an individual's "intellectual disposition" in each of the seven intelligences, as well as performance in 25 kinds of skills associated with each intelligence (e.g. instrumental and vocal for the musical intelligence) (p. 1). The questionnaire is composed of 106 items with 58 items that inquire about performance skill, 37 that inquire about frequency of participation and 11 that ask about level of expressed interest.

There are seven main scales, three research scales and twenty-five subscales. The seven main scales (which reflect the seven intelligences) are rated according to 1) very low, 2) low, 3) moderate, 4) high and 5) very high. The subscales provide a "qualitative and descriptive understanding of the person's skill in particular domains..." (p. 40). For example, the musical scale has four subscales: 1) vocal ability; 2) instrumental skill; 3) composing; and 4) active listener/appreciation. The research scales consist of "General Logic," "Innovation" and "Leadership" and are an adaptation of Gardner's proposition that there are "higher order" cognitive abilities that are related to but different from the seven forms of intelligence" (Shearer, 1996, p. 44). These research scales will not be used for the purposes of this study, since I will not require this level of data. The subscales (including an explanation) for each of the intelligences as outlined by Branton Shearer are as follows:

1) Linguistic
  - i) Expressive Sensitivity:
  - to pay attention and carefully use language for communication and expression
  - primarily oral
  - ii) Rhetorical Skill:
  - to use language effectively for interpersonal negotiation, persuasion
  - oral communication at school, work, home or among friends
  - iii) Written-Academic Ability
  - to use words well in writing to create reports, letters, stories
  - verbal memory, reading and writing

2) Logical/Mathematical
  - i) School Math:
  - did well in studying Math in school
  - ii) Everyday Skill With Math:
  - uses math effectively in everyday life
  - iii) Everyday Problem Solving (Logical Reasoning):
  - able to use logical reasoning to solve everyday problems
  - a curious investigative person
  - iv) Strategy Games:
  - good at games of skill and strategy
  - v) Science:
  - interested and involved in scientific-type inquiry
  - collected things and may have studied nature

3) Visual/Spatial
  - i) Spatial Awareness:
  - able to solve problems involving spatial orientation and moving objects through space such as driving a car, finding one's way around
  - ii) Working with Objects:
  - building, arranging, decorating, or fixing things, requires eye-hand coordination
  - iii) Artistic Design:
  - jobs or projects where aesthetic judgment and design are important

4) Kinesthetic
  - i) Athletics:
  - involvement in and skill for physical movement and other athletic activities
  - ii) Physical Dexterity: Working with Hands & Expressive Movement
  - able to use one's hand skillfully when working with objects
  - uses body for learning, dancing or acting

5) Interpersonal
  - i) Social Sensitivity:
  - to be aware and concerned about others
  - socially astute
  - ii) Social Persuasion:
  - able to influence others
  - iii) Interpersonal Work:
  - interest and skill for people oriented work
  - iv) Social Skill
  - skillful in maintaining interpersonal relationships

6) Intrapersonal

- i) Personal Knowledge/Efficacy:
  -aware of own strengths/needs and able to plan effectively to achieve personal goals
  - success and effectiveness in personal life, at school or vocational satisfaction
- ii) Self/Other Effectiveness:
  -able to get along with people

In addition to the explanation of the subscales of the musical intelligence, I have included a sample of the type of questions found under each of the four subscales.

7) Musical

- i) Active Listener/Appreciation:
  - active interest in music such as rock, classical, country, etc.
  As a child, did you have a strong liking for music or music classes?
- ii) Vocal Ability:
  - good voice for singing in tune and in harmony
  - good rhythm sense
  Could you sing "in tune"?
- iii) Instrumental Skill:
  -plays an instrument as a teenager or adult
  Did you ever learn to play an instrument?
- iv) Composing:
  - makes up songs or poetry and has tunes on her mind
  Did you ever make up songs or write music?

3. Written Assignment

Students will then be asked to complete a short written expository task as follows: Please write a short piece (no more than 800 words) for "Maclean's" (a Canadian magazine) about an historical figure, concept, value or culture that has greatly interested you in this course and that you feel people need to know about. Assume that your readers have at least a minimum high school education and are between the ages of 25 and 40 years old. You may (but do not have to) use any sources, references or personal experiences you wish.

4. Retrospective Accounts of the Composing Process

Students will be asked to give two retrospective accounts of their composing process in the form of a written journal and an interview.

a) Written Journal

Their journal report is to be entered immediately after completing a draft of their written assignment. They will be given the following instructions:

Immediately after you have finished a draft of your assignment, take 15 minutes to reflect on your writing experience and analyze what you did. Try to account for your choices. Note any difficulties you may have had and what you enjoyed or did not enjoy about this particular experience. Put these comments in writing; this is your journal report.

This task will allow students to reflect on their particular writing experience (e.g. the reasoning behind their decisions), and to comment on any area that the student may wish to comment on.

b) Interview

Students will be interviewed and asked questions about their composing processes and given the opportunity to further discuss their writing experience. They will have access to their original test, as well as their journal report during the interview.

I will therefore collect two different types of data in the form of journal reports and interviews. Each method has its advantages and disadvantages. For example, the journal reports are written immediately after completing the writing assignment; it is not directed by the researcher (myself) and the students have a certain amount of freedom to discuss whatever elements they choose. On the other hand, these reports could be vague and not go into sufficient detail for the purposes of this study. Interviews allow the researcher to probe for greater details and allow the subject to think about elements that they might not have considered before. The disadvantage is that the interviews will take place some time after the writing has occurred, and not immediately after.

It should be noted that I will not see the results of the MIDAS profiles until after the interviews have been completed. This is to ensure that there is no bias towards students during the interview process.

Data collected from the journal report, the interviews and my subjective reading of the written assignment will be summarized in a two page (approximately) composing profile for each participant. This composing profile will be an attempt to capture the participants' composing process. The dominant patterns of each participant will be noted based on the following areas (which are covered in the interviews) where applicable: time; medium of expression; environment; ideas/choosing a topic; structure/organization; revision process; feedback; context; content; language choice; feelings; and challenges. I will look for dominant patterns or behaviors as they suggest themselves in the composing profiles.

I will then look at the MIDAS scores and see if there are any connections between the composing styles of participants and strengths in certain intelligences.

Due to the small sample size, there will not be any statistical correlation between MIDAS scores and the particular ways students choose to compose. This study, however, is not as interested in finding a statistical correlation as in recognizing that individual learning differences could possibly affect the writing process. As stated earlier, this is intended to be a preliminary study only, and as such, I am hoping to find suggestive connections between a student's composing style and cognitive profile.

Summary of Findings

Firstly, the interviews revealed that the students' major area of studies included communications, development studies, French, law and society, leisure and tourism, religious studies, sociology, women's studies, and secondary math (as a focus for an education degree). Therefore, the students represented a reasonably diverse set of interests and could be expected to show some variety in their MIDAS scores. Furthermore, the data compiled from the journal report, the interview and my assessment of each student's article formed the basis for a composing profile for each student. After reviewing the data, I noted some general composing behaviors or preferences that emerged as evidenced by these composing profiles. As well, I asked the following question: were there any similarities in MIDAS scores between students with respect to these behaviors or preferences? These similarities are noted below.

After analyzing the data, it was clear that the subscales developed for the MIDAS did not contain enough questions specifically designed to uncover or reflect the writing process per se, with the exception of the Linguistic subscale, "Written-Academic Ability." This was the only subscale that was directly related to writing. Nevertheless, the MIDAS provided useful information about each student's cognitive profile—information that may greatly assist a writing instructor, especially in cases where a student's composing strategy is not working well.

I categorized the results as follows.

MIDAS SCORES
0-19..........very low
20-39........low
40-59........moderate
60-79........high
80-100......very high

Now let us look at the patterns that emerged with respect to the following categories. Please note: This section has been significantly condensed.

1. Planning and Organization

The majority of the students (6 out of 10) do a lot of the organizing and planning of their assignments in their heads. The students fell into one of the following sub-categories.

i) The "Nonplanners" (2)

Students who do very little pre-planning and sit down and write whatever comes into their heads.

June and Cassima had similar logical/mathematical scores (42.5 and 38.8), interpersonal scores (52.6 and 54.2) and intrapersonal scores (44.0 and 51.0). June's score in linguistic intelligence was low at 38.2, while Cassima's was high at 76.4.

ii) The "Light Planners" (2)

Students who do little pre-planning before writing and organize as they write.

Lydia and Crystal's MIDAS scores were similar across the board. They had low to moderate scores in all the intelligences. Both students' highest scores were in interpersonal intelligence (51.3 and 57.9). Their linguistic scores were moderate at 45.8 and 54.2 respectively.

iii) The "Outliners" (4)

Students who think about their topic in their heads and write down either general or main points or ideas on paper (sometimes in an outline form) and then begin writing on the computer.

In the linguistic subscale of Written-Academic Ability, three of these students had high to very high scores (75.0, 87.5, 93.8). The same three students also had high to very high logical/mathematical scores (71.1, 76.3, 87.5). All four students had high to very high interpersonal scores (60.5, 61.8, 69.7 and 92.1).

iv) The "Careful and Mental Planners" (2)

Students who plan and organize their assignments mostly in their heads.

The final group of students do most of the planning and all of the organizing entirely in their heads. For example, Mary says that she writes the entire essay in her head and enjoys this mental process. She does not do an outline, even for a research intensive paper. Brittany brainstorms in her head and usually does all of the organization in her head before she begins to write on the computer. She goes through several different drafts "in her head" in which she makes structural and editing changes.

Both Mary and Brittany had high to very high scores in the linguistic subscale of Written-Academic Ability (68.8 and 87.5) and high logical/mathematical scores (63.8 and 76.5).

2. Editing and Revisions

Most students edit and revise their work as they write. This may be a result of current computer technology, since it is far easier to make changes as you go on a computer than on paper. For instance, Darren states that he does not usually spend too much time on revisions and thinks that that happens because he is writing on the computer and therefore revises as he writes. According to Brittany, "most of my drafts are done in my head and little editing is done after the paper is completed." Diana says that she never writes a full complete draft; rather, she revises as she goes. The same can be said for Mary who said, "As I write, I revise."

With respect to the above students, three of them had high scores in the logical/mathematical intelligence (63.8, 76.3 and 76.5) while the fourth had a moderate score (57.5). In linguistic intelligence, the same three had high scores (62.5, 72.2 and 77.6), while the fourth had a moderate score of 53.9.

3. Attention Paid to the Audience

Seven out of ten students consciously paid attention to their audience while they were writing. Out of those seven, five students said that their concern for the audience affected their word choice and language. For example, Mary wrote an article entitled, "Does the End Always Justify the Means? The Machiavellian Perspective" in which she discussed Machiavellian philosophy as it is practised today. Mary paid attention to her audience (the Maclean's readers) by keeping them in the "back of [her] mind." She made sure that the abstract ideas that she discussed were clearly written for the average reader to understand. She commented that she "wrote more as [she] talked." This also affected her language choice.

Similarly, Darren was deeply concerned about his audience. His article for Maclean's was entitled, "What's missing in Society?" and concentrated on society's preoccupation with the external (or the material world) and their neglect of their own souls as well as a connection with God or "ultimate reality." Because of the audience, Darren paid attention to the language he used by writing more in "layman's terms." He said that he found it "hard...to switch mindsets" from the academic to the public sphere, and did not think that he had accomplished this well. In addition, in his journal report he stated that he had a "hard time deciding on what [his] audience should and should not hear and what [he] should and should not tell them."

These seven students were divided into two groups:

a) Those who state that attention to audience affects their content.

In the interpersonal subscale of Sensitivity (described as "to be aware and concerned about others; socially astute"), these two students had moderate to very high scores (54.2 and 96.4). Interestingly, their musical score was identical (82.1) and their linguistic score was very close (80.3 and 76.4). No other similarities were noted.

b) Those who state that their attention to audience affects both their content and the language/words they use.

Five students fell into this category and their scores (which ranged from moderate to high), in the subscale of Sensitivity were as follows: 57.1, 60.0, 60.7, 70.8 and 75.0. In addition, there were various similarities in their other MIDAS scores. For example, the students had moderate to very high logical/mathematical scores (57.5, 63.8, 71.1, 76.3 and 76.5). Their linguistic scores ranged from moderate to high (53.9, 58.8, 62.5, 72.2 and 77.6).

The students who did NOT pay attention to audience had moderate to high scores in the subscale of Sensitivity (42.9, 46.4, 60.7). They had very low, low and moderate logical/mathematical scores (19.4, 35.3 and 42.5). Their linguistic scores ranged from low to moderate (38.2, 45.8 and 54.2).

4. Visualization

Some students used words that evoked images or suggested a strong pattern of visualization.

In either the interview or the journal report, several students used words that suggested that they visualized their written assignments or used images. For example, in her journal report, Diana mentioned that for an assignment, she assembles in her mind, a "collage of ideas that in some way link together." Mary said that she was a "big picture person" and the parts "don't seem important unless I can see the whole." This suggests something about the way in which she processes information—needing to see the whole and not just the parts. Mary seems to have a fairly strong visual and holistic sense of her paper and the many different ways that ideas could be connected. In addition, Darren added that for a "really philosophical type paper, if [he] can't quite see how it's coming together, [he'll] have to draw it out."

It should be noted that the questions used in the MIDAS questionnaire to determine an individual's spatial intelligence are not apparently designed to capture the ability or the tendency to "visualize" an entire written assignment or parts thereof. Nor are the questions aimed at uncovering whether subjects need or prefer to "see" their paper or article either in their mind's eye or on paper during the composing process. The above notwithstanding, two out of the four students in this category had very high scores in the spatial intelligence subscale of Spatial Awareness and the other two had high scores (95, 80, 75 and 60).

The "non-visual" students all had lower spatial awareness scores with the exception of two students. One also had a Spatial Awareness score of 60 and the other had a score of 100. The student with the score of 100 also scored extremely high in ALL intelligences and subscales. It is possible that this student may have overestimated his abilities. His article was one of the poorest I received.

5. The Final "Product"

I compared the MIDAS scores of three students who submitted the strongest articles and another three who submitted articles containing significant errors. Of the three strongest articles, all three students had very high scores in the linguistic subscale of Written-Academic Ability (87.5, 87.5 and 93.8). Their overall logical/mathematical scores were high (63.8, 71.1 and 76.3). Similarly, the three students with the weakest articles had close linguistic scores in Written-Academic Ability (68.8, 68.8 and 75.0). It is interesting to note that these linguistic scores are also high, yet this ability and skill is not evidenced in these students' written work (for this assignment at least). It is possible that these students have overestimated their skills. In addition, two of these students had high to very high logical/mathematical scores (76.5 and 87.5) while the remaining student had a low logical/mathematical score of 38.8.

This also points to one of the interesting possibilities of focusing on composing behaviors as I have done, rather than simply on the final product. Products can vary for many different reasons including lack of time, a high stress level and lack of motivation on the part of the subjects. Composing behavior may vary as well but seems more stable and is more closely tied to the individual's cognitive processes. Therefore, the choice to look at process rather than simply product serves to add depth to this research.

6. Other Types of Composing Behavior that Suggest a Connection to the Multiple Intelligences

In addition, I noted certain characteristics in various students' composing profiles that suggested a connection with a particular intelligence (i.e. the student might either have a high score or a low score in that intelligence). For example, Cassima said that she ALWAYS listens to Pachelbel's Canon in D when she writes/studies. This suggests a strong appreciation of music. Her MIDAS score in musical intelligence was 82.1; in the musical subscale of Appreciation she scored 95.8.

Brittany said that she was excited about participating in this project because she would get something back in the form of knowledge about herself. She stated that she was very much "into self-evaluation." She scored very well in two subscales of intrapersonal intelligence. In Calculations, (described as "self-awareness that provides understanding of one's own logical reasoning" Shearer, p. 44), her score was 81.3. In Personal Knowledge, she scored 64.3.

In a similar light, Diana remarked that the article for Maclean's caused her to do some "introspection" and "soul-searching." She realized that she was not consistent with her own value system and this was a blow to her ego. These statements show Diana's strong ability to go within and analyze her feelings and motives. Therefore, while the assignment itself was no challenge for Diana, the nature of the assignment caused her to go within and take a serious look at her value system, which proved somewhat distressful to her. Diana's overall score in intrapersonal intelligence was high at 76.0.

Like Brittany, another student also stated during her interview that she was very interested in the MIDAS results and how that information might help her academically. Her intrapersonal score was moderate at 42.7. This might suggest that she at least recognizes the need to learn more about herself.

Summary

From the interviews and journal reports, it is clear that students have different composing styles. Based on the MIDAS results, we see that students have differing cognitive profiles as well. From the above research, it is clear that in many cases, there was a connection (albeit a tentative one), between students' specific composing strategies and their level of development in specific intelligences. For example, the students who do a high degree of planning (the "Outliners" and the "Careful Mental Planners") all have high to very high scores in logical/mathematical intelligence and high to very high scores in linguistic intelligence (specifically in Written-Academic Ability). Their scores were higher in these two intelligences than the students who do not spend much time planning (with the exception of one student in the linguistic subscale of Written-Academic Ability).

With respect to attention to audience, all the students who said they paid attention to their audience had moderate to very high scores in the interpersonal subscale of Sensitivity. (With the exception of the one student with a score of 60.7, the two other students who did NOT pay any attention to audience had lower scores.)

Furthermore, with regard to the other types of composing behavior that suggest a connection to the multiple intelligences, it is evident that students who used words that evoked images or suggested a strong pattern of visualization, all had high to very high scores in Spatial Awareness. In addition, the student who always listens to music when she writes had a very high score in the musical intelligence. All of this points to a connection between students' composing styles and their cognitive profiles.

From the above results it is also evident that students who exhibited similar composing strategies had similar scores in certain intelligences. This may have implications for teaching writing to large groups of students.

The above also suggests that a writing instructor should not give all students the same set of composing strategies, but rather the strategies or interventions need to be matched with the students' respective strengths, as reflected in their cognitive profiles.

Implications for Teaching – Writing From a Multiple Intelligences Perspective

We have now noted some connections between composing processes and preferences of students and their cognitive profiles as expressed through the MIDAS. In the original study, I analyzed in depth both the composing profile and the cognitive profile of one student whose article was significantly lacking in several areas and then made specific suggestions for improvement. Let us turn instead to the possible implications for teaching many different kinds of students from a multiple intelligences perspective.

If the reader will recall, several researchers including Tucker (1995), Grow (1995) and Smagorinsky (1991, 1995a, 1995b), while differing in their approach, have suggested that teaching writing from a multiple intelligences perspective may have significant advantages for students. Tucker pointed out that "composing styles could be made compatible with the cognitive strengths of the writer" (p.30). He also stated that teachers must become careful observers in order to truly suggest meaningful composing strategies in line with writers' strengths and weaknesses (p.31). In light of the above, let us explore what some of these composing strategies might be.

Grow (1995) whose article entitled, "Writing and the Seven Intelligences," while highly speculative, still provides some interesting possibilities about engaging the multiple intelligences in the writing process. As mentioned previously, Grow takes each of the intelligences in turn and explores how they might be used to assist the writer. Let us begin with spatial intelligence.
In their book, *Teaching & Learning Through Multiple Intelligences,* Campbell, Campbell and Dickson (1996), outline 4 types of visual note taking and brainstorming tools that engage the spatial intelligence. These tools include concept mapping, clustering, Mind Mapping and mindscaping (a variation of Mind Mapping). Grow only mentions Mind Mapping. (Samples of each tool were included as appendices in the original study.) These techniques may be of great benefit especially to those students who used words that evoked images or suggested a strong pattern of visualization. For example, Darren, Mary and Diana, who each have a well-developed spatial intelligence, may find that these techniques

or strategies enhance their writing experience because they fit well with their respective cognitive profiles. Similarly, any student with a well-developed spatial intelligence may benefit greatly from the above techniques.

Grow states that writing teachers need no suggestions on how to engage the linguistic intelligence, although teachers may need to be reminded that students express their linguistic intelligence verbally as well as through writing. If we look at Cassima who submitted a poorly written article, her linguistic score was high at 76.4. In her interview, Cassima remarked to me that she would much rather give a speech than write an article.

In her experience, giving a speech in front of thousands (which she has done), is much more enjoyable because there is the opportunity to interact with the audience. Cassima does not see that opportunity with respect to a written article. Cassima obviously enjoys interacting with others and this is evidenced by her high score of 66.7 in the Working with People subscale of interpersonal intelligence.

I would suggest that Cassima and any other students who have similar profiles make good use of their linguistic and interpersonal intelligences and perhaps think of any written assignment they have to do as a speech first (Cassima mentioned doing this during her interview). Students may wish to get together with a friend and "rehearse" the speech in order to get valuable feedback on a variety of issues such as coherence and choice of words. In addition, I also noticed that Cassima has a high score in spatial intelligence (70.3) with a very high score in the subscale of Art Design (85.0). It stands to reason then to introduce Cassima to the visual techniques discussed previously so that she may decide whether or not they can assist her.

Another way for students to make good use of their developed interpersonal intelligence is to work in groups. Campbell, Campbell and Dickson recommend that teachers form writing groups in which students have the opportunity to get feedback on their "works-in-progress" *and* learn how to edit and make suggestions for improvement to other students at the same time. These authors state that while "[serving] as a sounding board for ideas about a writing topic" and "[giving] feedback on rough drafts," the group also most importantly "offers support and encouragement for the difficult task of improving written work" (p.25). These types of groups may be of valuable assistance to those students with highly developed interpersonal intelligences such as Lydia, Diana, Andrea and Crystal who each had high to very high scores in the interpersonal subscale of Working With People. Their scores were 66.7, 75.0, 83.3 and 91.7 respectively. It is possible that these students, like myself might enjoy "bouncing ideas off' someone else and interacting with others. If given this opportunity, it may have a significant positive effect on their writing experience as a whole.

Conversely, students with well-developed intrapersonal intelligence may welcome the chance to explore their own feelings and experiences about a particular topic before writing about it *alone*. Nearly all the students in this study chose a topic that was meaningful *for them*. In fact, one student remarked that the topic *must be* meaningful to her because that is what motivates her to write. Whether or not the student arrives at this point of "meaning" through a group or alone perhaps should be the choice of the student under the guidance of an informed writing instructor.

If a student is struggling with a topic (or choosing a topic) an instructor might suggest that she use her intrapersonal intelligence to explore her own feelings and opinions about the topic and perhaps draw from personal experiences. This may give her the motivation she needs to begin writing or to clarify her thoughts. Another way to engage the intrapersonal intelligence is by keeping a journal. (Several of the students in this study keep a personal journal.) Grow remarks that "journals.. provide powerful vehicles for recording introspections, for reflecting on experience, and for coming to understand one's core concerns, skills, feelings, and values" (p. 9).

With respect to logical/mathematical intelligence, it is clear that instructors have had ample experience engaging this intelligence. One has to only look at the logical, linear, sequential outlines which have been and are still being taught to students every year. That is not to say that there is anything wrong with this type of outline and approach to writing. For students with highly developed logical/mathematical intelligences, this might work very well. Indeed for Andrea, who wrote one of the three strongest articles in this study, this type of outline works for her. Again, the question is not so much whether the strategy or technique is useful, but rather, does that particular strategy work for that particular student? That is the question that writing instructors must keep in the back of their minds.

Finally, in reviewing both the kinesthetic intelligence and the musical intelligence, I could not find any techniques particularly relevant to the aims of this study. Certainly, as previously mentioned, it may help some students to physically paste scraps of paper on a poster or write down main ideas or areas of research on cue cards in order to spread them out and rearrange them. It should be noted that since none of these intelligences work independently, the students would be employing other intelligences as well.

Furthermore, with regards to the musical intelligence, some students may benefit by listening to music as they write. There is current research (Barzakov, 1991; DePorter, 1992, Jensen, 1995) that suggest that listening to specific pieces of classical music stimulates the brain and has a positive physiological effect on the body. Educator and author Eric Jensen points to recent research that indicates that music "affects the emotions, the respiratory system, the heart rate, the posture and the mental images of the listener. These effects can dramatically alter the composite mood, state, and physiology of a person" (p. 205). Both Cassima and Brittany (who listen to music to "inspire" them), as well as other students in general, may benefit from the outcome of this research on using music to study and/or write.

By viewing the writing process from a multiple intelligences perspective, we have briefly explored various strategies and techniques that may assist students as they tackle the task of writing. It should be noted that the previous suggestions in this section would need to be "tested" by the students and tailored to their individual needs and further research would be required. Therefore, this section is intended to be suggestive only.

Conclusion

What does all of this mean to writing teachers/instructors? It means that we need to remember the words of Bill Tucker (1995) who warns teachers not to assume that their students compose the same way they do. Tucker believes that if teachers are very careful about assessing the cognitive profiles of their students, then teachers would be in a better position to advise students concerning their "composing strategies" (p 31). And finally he suggests that "composing styles [can] be made compatible with the cognitive strengths of the writer" (p 30). I agree with Tucker. In sum, the more teachers know about their students, the greater their ability to teach them. While the present study has not "statistically proved" Tucker's statements, it certainly has provided some relevant research that points in the same direction.

Implications for Further Research

Future researchers interested in the application of MI theory to writing may wish to explore other avenues in addition to those explored here. Indeed, there are many ways that the present study could be extended.

An extended sample size, for example, would provide more statistical validity to the findings and perhaps show a definite correlation between certain composing strategies used by the students and strengths in certain intelligences. This may, in turn, suggest changes as to how writing is taught to large groups of students.

Furthermore, it appears that the quality of the product may be partly dependent on a match or mismatch between intelligence strength and composing style. A future three-way study that matched intelligence, composing style and product quality, employing a significantly larger group of students, might point in this direction.

In addition, several variations might be useful. For example, the type of students could be varied to include students in specialized subject areas. Do these groups of students have similar cognitive profiles? Are there particular strategies a writing instructor might employ that would greatly assist these groups of students to gain a level of competency in writing?

The types of writing assignments can also be varied. Do students employ different composing strategies to deal with different kinds of assignments? For example, how do they approach a 20 page, research-intensive, academic paper versus a 2 page article for a magazine? Do students with strengths in particular intelligences excel at specific types of assignments? For example, do students with a cognitive profile that shows a high intrapersonal intelligence and low logical/mathematical intelligence find writing assignments of a more personal nature, easier to write than a very argumentative type of assignment that requires the student to present the "facts?" Again, how does all of this bear on the instruction of writing?

In addition, the methodology to study composition could include think-aloud protocols which would "capture" the composing process as it happens. This would add a more complex level of data to the research. Similarly the cognitive profiles of students could be "mapped out" using both the MIDAS and an instrument such as the Gregorc Style Delineator developed by Professor Anthony Gregorc, to provide another "window" into how the students process information.

Final Comments

The application of the theory of multiple intelligences to the study of composition and the teaching of writing is clearly an area that requires further research. At present, many students of all ages struggle with writing. They have well-meaning writing teachers/instructors who give them a set of strategies that do not always work. Or perhaps they devise and use their own strategies that unfortunately work against them (i.e. the strategies do not complement the student's natural strengths). Future research in this area could open up a whole new world for students. It is possible that they could be shown how to sharpen both the linguistic and the logical/mathematical intelligences (which are certainly called upon when composing). In fact, authors Armstrong (1993) and Lazear (1994) suggest that students (or anyone for that matter), can learn to sharpen all of their intelligences.

Furthermore, students could be shown how to utilize their intelligences that are already well-developed and use this to their advantage not only for writing, but for other subjects as well. As noted in the original study, many educators have taken Gardner's theory and have applied it in their classrooms with success. Gardner (1995), however, cautions that we need to go beyond merely categorizing students. In fact, the deeper application of MI theory pushes us to look at learning and teaching differently. Teacher Janet McClaskey (1995) reminds us that "it is not enough that teachers learn to recognize the types of intelligences of their students; rather we must find ways to share that knowledge with the students themselves so that they will be able to use their skills in situations outside of our classrooms" (p. 59). And this, I would venture to guess, may be the ultimate goal of many writing teachers/instructors—that their students acquire excellent written communication skills that they can use to express themselves in meaningful ways and thereby contribute to society as a whole. It is apparent from this study that future research involving the application of the theory of multiple intelligences to the writing process could greatly enhance the work of writing teachers and instructors everywhere who continually search for ways to solve the "mystery" of writing for the writers and learners who look to them for guidance. Of course, the theory of multiple intelligences is not the only answer. But it certainly is a good place to start.

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Journal of Accelerated Learning and Teaching
Volume 23, Issue 1 & 2 Spring, 1998

Book Review
The Mozart Effect by Don Campbell

Reviewed by Bonnie Tsai

We all know that music can affect our mood: it can make us feel happy enchanted, heroic, inspired, empowered, comforted, wistful and even excited; But Don Campbell leads us into a world which those of us who have worked with music have always suspected. Quite simply, MUSIC IS GOOD FOR YOU.

Why the Mozart Effect? Regardless of the listener's tastes or previous exposure to the composer, the music of Mozart invariably calms listeners, improves spatial perception and allows them to express themselves more clearly-in other words communicate with the heart and the mind.

In his well-documented book, Don Campbell writes about the work of Alfred Tomatis and why he chose Mozart and Gregorian Chants to aid people who had difficulties with hearing and listening. From here he leads us into the fascinating world of toning and chanting. There are very simple exercises we can do for 5-10 minutes a day. One that I really loved was humming to block out unpleasant noises that one hears everyday in large cities. Don points out that "no one will hear you and if they do just explain why you are humming and they will join in with you. He also gives some wonderful activities, which can be used with business people. This particularly interested me because I have been looking for ways to use music, which would fit, in with the business world. He has a chapter on the relationship between music and memory. In this part of the book he writes about Accelerated Learning and recognizes the important work Dr. Lozanov is doing in the field of educational today.

Mozart was surrounded by music from before his birth, all through his life and at his death. On his deathbed he sang the alto part of "Lacrimosa", imitating the trumpets by puffing out his cheeks. "Here is my death song," he said, invigorated by the music. "I must not leave it incomplete." One of the most touching parts was his description of the work of Therese Schroeder-Sheker and her Chalice of Repose Project, which performs a sort of "musical midwifery" by aiding the dying to leave this world with dignity and in peace.

All in all this book is a "must" for everyone who would like to discover how music can improve health, raise their spatial IQ, boost creativity and "make the spirit sing." Don Campbell takes us through music in all its aspects without being judgmental as to styles or trends.

Many "IALers" will remember Don Campbell from his very moving plenary at the 1999 conference recently held in Houston.

Sources of reference information on accelerated learning

The easiest access to published information on accelerative (-ed) learning, SALT, suggestopedia, and Super Learning is through the ERIC system available in many university and college libraries. Secondary sources are *Dissertation Abstracts* and *Psychological Abstracts* along with the periodic author and topic indices of the *Journal of Accelerative Learning and Teaching*. Chapter 3 of *Suggestive Accelerative Learning Techniques* (1986) by Schuster and Gritton [University of Toronto Press] has an extensive review of the literature then available.

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1977, 2(1&2): 181723; 2(3&4): 165460
1978, 3(1):181721; 3(2): 181722; 3(3): 202238; 3(4): 191282
1979, 4(1): 192560; 4(2): 193944; 4(3): 193945; 4(4): 362044/FLO21508
1980, 5(1): 248729; 5(2): 249814; 5(3) & 5(4): 258461 [2/6 fiches]
1981, 6(1) to 6(4): all in 258461 [4/6 fiches]
1982, 7(1) to 7(4): all in 259580 [4 fiches]
1983, 8(1&2) to 8(3&4): 266650 [2 fiches]
1984, 9(1) to 9(4): 267610 [4 fiches]
1985, 10(1) to 10(4): ED285414/ FL016894
1986, 11(1) to 11(4): ED322717/ FL018672 [4 fiches]
1987, 12(1) to 12(4): ED362045/ FL021509 [3 fiches]
1988, 13(1) to 13(4): ED333745/ FL019244

1989, 14(1) to 14(4): ED333444/ FL019243

1990, 15(1&2) to 15(3&4): ED347789/ FL019250 [3 fiches]

1991, 16(1) to 16(4): ED345584/ FL020425 [5 fiches]

1992, 17(1&2) to 17(3&4): ED355806/ FL021071 [4 fiches]

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1995, 20(1) to 20(4): not available yet as of 4-14-96

Write: ERIC Document Reproduction Service, Dyn Tel Corp., 7420 Fullerton Rd. #110, Springfield, VA 22153-2852. Phone: 1-800-443-ERIC.

The Library of Congress has assigned these two international Standard Serial Numbers to JSALT:

ISSN 0272-622X: Journal of Suggestive Accelerative Learning and Teaching, Volumes 1-4.

ISSN 0273-2459: Journal of the Society for Accelerative Learning and Teaching, Volumes 5 to 20.

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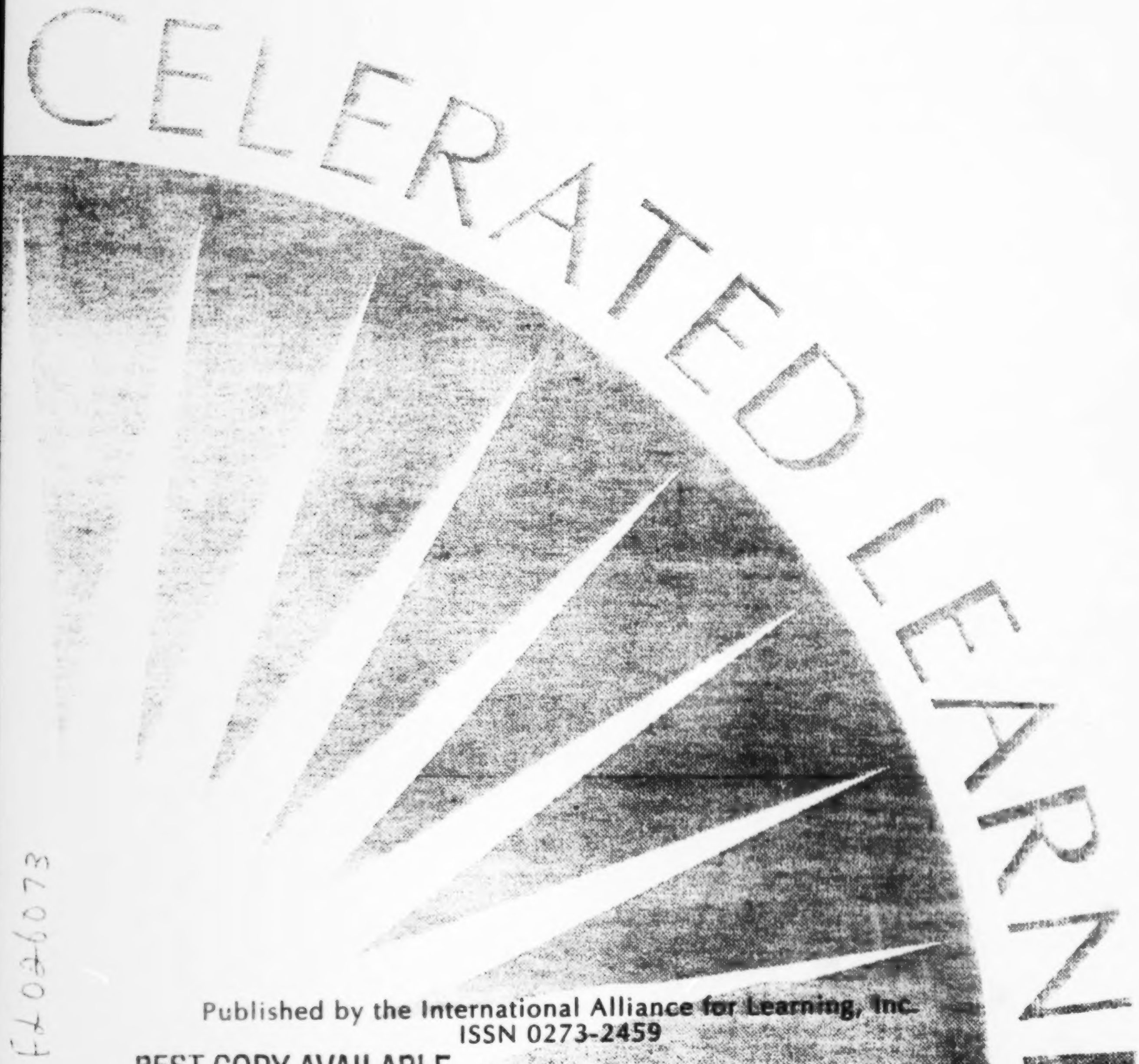
THE JOURNAL OF ACCELERATED LEARNING AND TEACHING

Volume 23, Issue 3 & 4 Fall, 1998



Published by the International Alliance for Learning, Inc.
ISSN 0273-2459

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Volume 23, Issue 3 & 4 Fall, 1998

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Journal of Accelerated Learning and Teaching
Volume 23, Issue 3 & 4 Fall, 1998

Cognitive Skills and Accelerated Learning Memory Training Using Interactive Media Improves Academic Performance In Reading and Math

By Jan Kuyper-Erland

ABSTRACT

This pre-post combined experimental and quasi-experimental study was conducted to determine if the effects of former successful applications of accelerated learning, (AL), memory, and cognitive skills interactive media training could be replicated in multiple classrooms (Erland, 1989). Earlier quasi-experimental 12-week studies with fifth-grade public school classes revealed gains on cognitive skills tests transferring to high gains in reading and math that lasted longitudinally (Erland, 1994, 1992). This 10-week experimental application (30-40 minutes daily, Mon-Fri) of training sequencing-logic skills and pattern-finding through accelerated learning methods is called the Bridge To Achievement (BTA). The study expanded on practical applications of Bandura's Social Learning Theory (1986; 1971) and Guilford's Structure of Intellect (1986; 1967) by improving weak cognitive skill and memory areas, and further accelerating strong areas. Therefore, students were expected to strengthen their visual, auditory, tactile, and kinesthetic modalities and learn successfully through several primary styles instead of being limited to only a few modalities or styles. This study demonstrated the strength and viability of accelerated learning practice as shown by varying degrees of implementation adherence. Even the most incomplete BTA-AL implementation integrity applications evidenced achievement test gains.

Two Midwestern parochial schools comprised this study: School 1 and School 2. School 1, with 97 students in intact year-to-year grades 4-8, formed the quasi-experimental study. School 2, with 172 students in grades 4-7, participated in the experimental study. These combined groups totaled 269 students from fourteen classrooms. Both schools had control groups of combined 71 controls. The 5th and 6th grade control groups received an equally prescribed content and time treatment with an Alternate Media Activity (AMA) that included elements from nineteen commercially popular media and print products. Student progress and achievement were measured by continuous classroom benchmarking and by the nationally standardized achievement test, *The Iowa Tests of Basic Skills* (*ITBS*). Standardized cognitive skill measures were also administered and cross-analyzed.

The eleven experimental classrooms had sixty-five academic subjects that were statistically significant over the controls and norms combined. The Experimentals showed marked strengths in ninety academic subject areas that either matched the high performing controls' results, or were statistically significant over both the norms and controls. The experimentals had

twenty-three academic subject areas that were statistically significant over the controls in reading, math, language, spelling, science, and social science. A follow-up report documenting that these gains were maintained longitudinally is in publication process.

The role cognitive skills play in the processing of information.

Good information processing capability is key to successful learning and task competency (Sternberg, 1991,1985). Underlying cognitive skills and memory levels must be in place before information processes effectively to the conceptualization and higher-order thinking skill level (Hessler, 1982; Woodcock, 1978). With strengths and weaknesses within the individual's cognitive structure, it makes sense to train cognitive skills and strengthen memory levels to enhance not only the ability to learn, but to create the foundation for productive life-work skills (Sternberg, 1991; Meeker, 1991, 1969; Erland, 1989a, & 1989b; and Feuerstein, 1988).

Consideration must be given how to effectively and efficiently train cognitive skills. Bandura (1997) developed a promising new dictum on how individuals interact with his Social Cognitive Theory (SCT). Included in SCT is a person's ability to self-monitor, self-reflect, and have forethought.

Cognitive training is rapidly changing with emphasis on the use of computer-based and media presentations (Meeker 1999). One study's finding was that training effectiveness is determined not only by the training content and media presentation (Toranger, Pepin, & Talbert, 1992), but also by the individual's self efficacy and willingness to improve (Cristoph, Schoenfeld & Tansky, 1998).

Hypothesis

In this study, we hypothesize that weak cognitive skill and memory areas can be improved with daily thirty to forty minute sessions of a media-driven accelerated learning application for ten-weeks, by enhancing all three primary learning modalities: visual, auditory, and tactile leading to an increased ability to conceptualize and apply critical thinking. Furthermore, the whole-brain accelerated learning program, The Bridge To Achievement (The BTA), will improve memory and cognitive skills, thereby creating higher reading and math achievement test scores than will a conventionally taught Alternate Media Activity (AMA), which does not include accelerated learning techniques.

Key Questions Addressed

Can prescriptive cognitive retraining, designed to elevate low cognitive skills and memory by improving the underpinnings of problem solving and higher order reasoning, be generalized to academic achievement in reading and math? Even if standardized testing identifies problematic cognitive skill areas, the question remains: can deficiencies such as low visual and auditory memory (listening) be addressed and improved in the classroom, thereby giving each student the personal empowerment of all learning modalities? If visual and auditory perception, sequencing, and detail are systematically improved, will it help the student to integrate information easier resulting in higher achievement in reading, math, and science? With improved listening ability, will classroom instructions be more easily followed?

In the case of severe learning problems, often all three primary modalities are weak. Can these learning problems be improved, so slower students can work side by side with capable students? Can learning styles be redefined, so students are not limited in learning styles, and all primary modalities of visual, auditory, tactile, and kinesthetic are activated?

Definition:

The Bridge To Achievement (The BTA) is non-commercialized cognitive skills and memory research-based training that combines the arts, science, and education to improve academics, particularly reading and mathematical skills. The interdisciplinary program trains memory and cognitive skills in twenty-four hours of consecutive daily training for eight to ten weeks. The BTA is an inter-modality whole-brain learning approach that teaches pattern-detection (Coward, 1990) and analytical skills (Gardner, 1993b). The program is a hybrid of six prominent theories and is based on Woodcock's 1978, Level of Processing model (See Figure 1) and Erland's, 1989 Hierarchy of Thinking. First, perceptual skills are improved, then visual and auditory memory, cognitive skills, and finally higher-order thinking skills evolve.

Literature Review

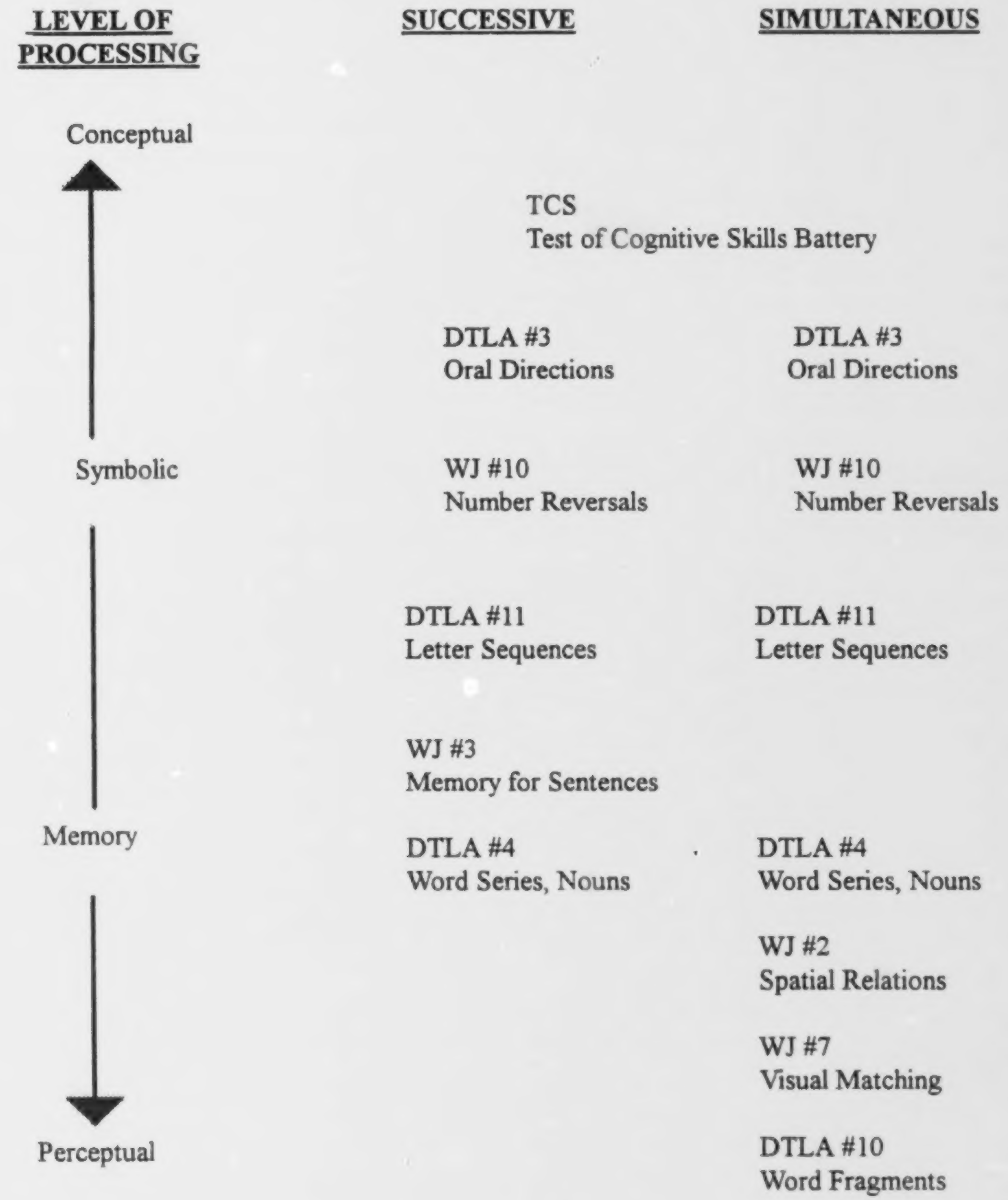
Elements from the following six complementary theories were incorporated into the procedures in this study:

- Guilford's Structure of Intellect (SOI) (Guilford, 1967)
- Suggestopedia, Accelerated Learning (Lozanov, 1978)
- Sensory Integration (Fisher, Murray and Bundy, 1991; Ayres, 1972; Gillingham and Stillman, 1970).
- Simultaneous vs. Sequential Dichotomy (Kaufman & Kaufman, 1983).
- Cognitive Behavior Modification, CBM (Meichenbaum, 1977, Bandura, 1971, Skinner, 1952, & Piaget, 1950).
- Intelligence Theories (Gardner, 1993b; Sternberg, 1985).

The Hierarchy of Thinking model was applied to this study (Erland, 1989). This model depicting how sequential memory levels play an important part in learning, was based upon Woodcock's 1978, processing theory (Woodcock, 1978) (See Figure 1).

The *Hierarchy of Thinking* (Erland, 1989), (See Figure 2A, 2B and 2C), central to The Bridge To Achievement training, indicates that specialized cognitive training should be a three-stage process beginning with the Left-Brain Model, Moving to the Right-Brain Model, and finally progressing to the Whole-Brain Model. Activating encoding-decoding ability through drilling practice incorporates this metacognitive process (Halpern, 1998; Erland 1989a) (See Figure 2).

Figure 1



LEVEL OF PROCESSING	SUCCESSIVE	SIMULTANEOUS
Conceptual		
	TCS Test of Cognitive Skills Battery	
	DTLA #3 Oral Directions	DTLA #3 Oral Directions
Symbolic	WJ #10 Number Reversals	WJ #10 Number Reversals
	DTLA #11 Letter Sequences	DTLA #11 Letter Sequences
	WJ #3 Memory for Sentences	
Memory	DTLA #4 Word Series, Nouns	DTLA #4 Word Series, Nouns
		WJ #2 Spatial Relations
		WJ #7 Visual Matching
Perceptual		DTLA #10 Word Fragments

TCS = Test Cognitive Skills, Sullivan, Clark, and Tiegs, 1981
Based upon the California Maturity Scales
DTLA-2 = Detroit Tests of Learning Aptitude, Hammill, 1985
WJ = Woodcock Johnson Psycho-Educational Cognitive Skills Battery,
Woodcock and Johnson, 1978, 1989

Based upon Johnson & Myklebust's information processing hierarchy theory (1967), and adapted from Woodcock's level of processing theory (1978).

Figure 2A

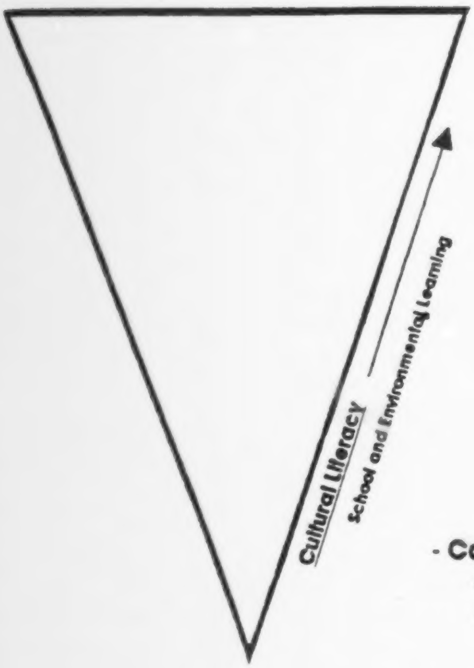
Steps to Critical Thinking

Hierarchy of Thinking

Left-Brain Model

Specialized Training for All Hierarchy Levels

Critical Thinking Ability


Cultural Literacy
School and Environmental Learning

- **Abstract Problem-Solving**
- **Automatic Thinking**
  - ***Parallel Thinking of Several Related or Nonrelated Thoughts***
- **Integrating Multiple Relationships**
  - ***Short-Term Sequential Memory Training***
  - ***Short-Long-Term Memory Retention***
- **Controlled Thinking**
  - ***Rote Short-Term Memory for Details***
  - ***Concrete Learning***

Patterns - Environmental Sensory Input

Figure 2B

Steps to Critical Thinking

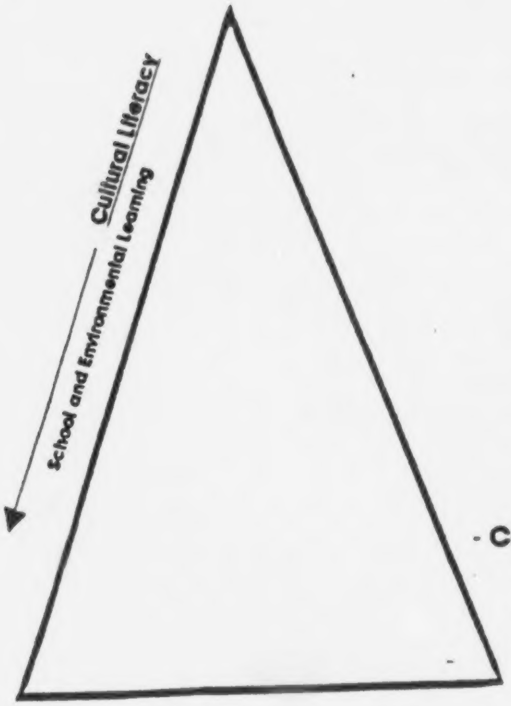
Hierarchy of Thinking

Right-Brain Model

Specialized Training for All Hierarchy Levels

Critical Thinking Ability

Patterns - Environmental Sensory Input



- **Abstract Problem-Solving**
- **Automatic Thinking**
  - ***Parallel Thinking of Several Related or Nonrelated Thoughts***
- **Integrating Multiple Relationships**
  - ***Short-Term Sequential Memory Training***
  - ***Short-Long-Term Memory Retention***
- **Controlled Thinking**
  - ***Rote Short-Term Memory for Details***
  - ***Concrete Learning***

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Figure 2C

Steps to Critical Thinking

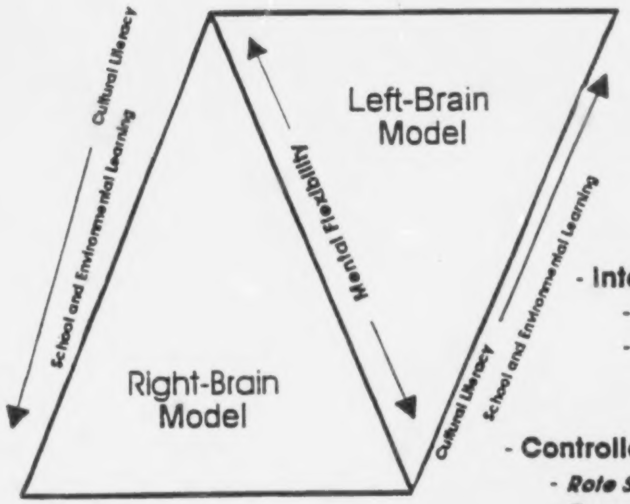
Hierarchy of Thinking

Whole-Brain Model

Specialized Training for All Hierarchy Levels

Critical Thinking Ability

Patterns - Environmental Sensory Input


Left-Brain Model
Right-Brain Model
Mental Flexibility
Cultural Literacy
School and Environmental Learning
Cultural Literacy
School and Environmental Learning

- **Abstract Problem-Solving**
- **Automatic Thinking**
  - ***Parallel Thinking of Several Related or Nonrelated Thoughts***
- **Integrating Multiple Relationships**
  - ***Short-Term Sequential Memory Training***
  - ***Short-Long-Term Memory Retention***
- **Controlled Thinking**
  - ***Rote Short-Term Memory for Details***
  - ***Concrete Learning***

Patterns - Environmental Sensory Input

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When underlying sequential memory components become "deeply learned" in a short-term memory rehearsal format (Baddeley, 1993), an encoding-decoding bridge is formed between the perceptual level and reasoning (Metcalfe and Shimamura, 1994). The resultant improvement in short-term memory and decoding-encoding ability create mental fluidity with multiple relationships, and critical thinking can ensue (Erland, 1994; Paul, 1992; Klahr, & Kotovsky, 1989; Guilford, 1984).

Weak cognitive skill areas are improved, (Erland 1989a) and the ability to learn new information is enhanced (Meeker, 1999). This process creates The Integrated Learning Plan for all students (Clark, 1986) (Figure 3).

Abilities and Academic Content.

Abilities Content

Twenty-four primary cognitive thinking ability functions (twelve paired) were incorporated into the study's exercise using puppets in a rehearsal paradigm (Erland, 1994, 1989a, 1990, 1981) (See Figure 4). Each drill consisted of six to nine steps (See Figure 5). Each step shifted back and forth from spatial to linear (Gathercole, Peaker, and Pickering, 1998), synthesis to analysis, encoding to decoding, visual to auditory closure patterns, and inductive to deductive reasoning (See Figure 1, Woodcock, 1978).

1. Spatial and Linear Relationships

Spatial skills, crucial in learning the concept of place value with digits, comparison of sets, rational counting, and general mathematical calculating, were also coupled with linear placement (Gathercole, Peaker, and Pickering, 1998; Meeker, 1991, 1969; Margolis, 1987).
Linear cognitive thinking is reflected in visual and auditory sequential memory, which is the foundation for analysis or analytical thinking, including reading, mathematics, spelling, and written composition. (Simpson, 1991).

2. Synthesis and Analysis

Analysis and Synthesis are a higher level of cognitive functioning. Students must reach this level of processing in order for reasoning to commence (Woodcock, 1978; Hessler, 1982). Reasoning ability is achieved through the ability to sequence information, identify patterns and absorb symbolic information.

3. Visual and Auditory Memory Encoding and Decoding

The ability to decode words phonetically is crucial to reading comprehension (Kamhi & Catts,1989). The objective of reading is to become aware of the thought units on a page without being aware of the individual letters and words (Rumelhart & McClelland, 1986). Written symbols must be decoded before they can be encoded into meaning.

4. Visual and Auditory Attention, Discrimination, and Closure for Details

Exercises in attention, discrimination, and closure for details are important foundational abilities

61

for reading and oral communication (Meeker 1991, Guilford, 1967). According to Kirk & Chalfant (1984), closure may be defined as the recognition of a whole gestalt when one or more parts of the whole are missing. Visual content includes three types: Figural (pictures, graphics), Symbolic (notational - symbols, letters, numbers), and Semantic (verbal, the meaning of words). Students with poor auditory closure often have difficulty with reading, and oral communication. (Kirk & Chalfant, 1984; Rumelhart, & McClelland, 1986).

5. Inductive and Deductive Reasoning

Deductive reasoning is applied through exercises in logic and reasoning. Sternberg (l992) discusses a three-part reasoning plan which begins with understanding the problem, then devising a plan which consists of serial ordering, then executing the plan without error, and finally considering alternative methods that may exist.

6. Visual Imagery and Verbalization

Visual imagery (simultaneous processing) and verbalization (successive processing) are crucial components of thinking. Paivio (1986) states that a dual-processing system, comprised of nonverbal imagery and oral symbolic processes (Stevenson, 1993; Schiffer & Steele, 1988), is the underlying foundation for memory and thinking, and share common and distinct cognitive mechanisms (Gathercole, Peaker, and Pickering, 1998).

Academic Content

1. Sight Words and Reading Comprehension (See Figure 5).

A series of unrelated sight words was drilled daily according to memory-span length (Collins, 1994; Garner, 1987; Miller, 1956). Sets of two can be gradually extended to sets of ten. Sight words were presented both visually and auditorially by reciting (Blakely and Spence 1990). Kamhi & Catts (1989) indicated that rehearsal of unrelated sight words improved speed of word recognition, and also reading comprehension of remedial 7th grade students (Deschant, 1991; Cairney, 1990).

Howard (1983) suggests three major processing differences between good and poor readers: (1) the use of phonemic coding in working memory, (2) the capacity of working memory, and (3) the speed of encoding letters.

2. Vocabulary and Latin Root Words

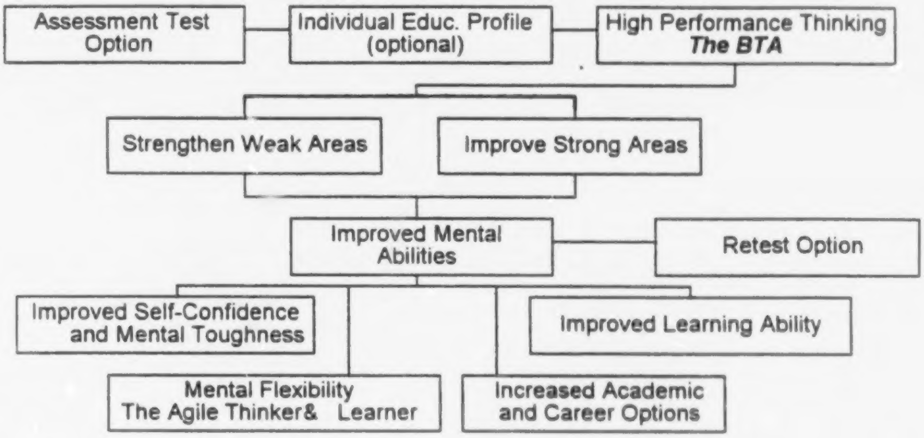
Individual words from reading content were taught according to meaning inference, both in and out of context. Latin root-word derivatives were also drilled and learned. Reading comprehension and vocabulary skill (Gardner, 1993b; Sternberg, 1985; Devine, 1982) A lack of vocabulary skill creates "word holes" in sentences for the reader (Meeker 1991).

3. . Spelling

Procedures for learning new spelling words, taught within the regular class language curriculum, were taught according to scope and sequence, or difficulty level progression (Downing, Lima & Noonan, 1992). Emphasis was placed on attack, rehearsal, and long-term memory techniques (Manning, 1996) Although specific spelling words were not applied within this study, alphabet letter rehearsal was drilled. This was designed to enhance visualization and placement value of

Figure 3

The BTA® Integrated Learning Plan


Assessment Test Option
Individual Educ. Profile (optional)
High Performance Thinking *The BTA*
Strengthen Weak Areas
Improve Strong Areas
Improved Mental Abilities
Retest Option
Improved Self-Confidence and Mental Toughness
Improved Learning Ability
Mental Flexibility The Agile Thinker& Learner
Increased Academic and Career Options

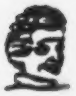
Designed for Schools, Businesses, Industry, and Private-Small Groups

2-, 3-, 8- Week Plans Available

figure 4.

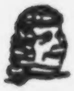
These characters do the speaking in each lesson:

WAYNE



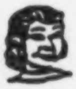
Low pitch

MADELINE



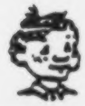
Raspy quality

LILY



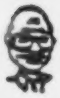
High pitch

BUTCH



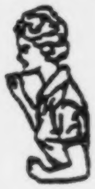
Soft dynamics

PROFESSOR

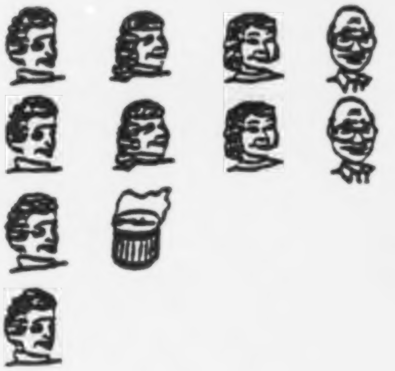


Loud dynamics

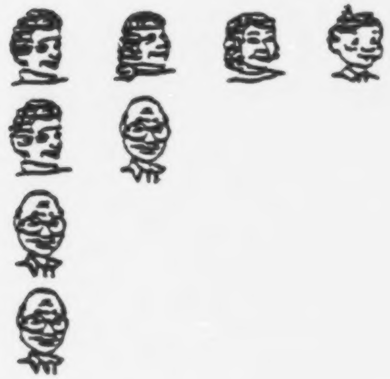
INSTRUCTOR



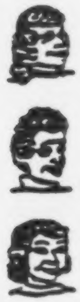
TYPICAL CHARACTER REPETITION ORDER



- repetition 1
  (Wayne, Madeline, Lily, Professor)
- repetition 2
  (Wayne, Madeline, Lily, Professor)
- repetition 3
  (Wayne, drum)
- repetition 4
  (Wayne)



- repetition 1 (directions)
  (Wayne, Madeline, Lily, Butch)
- repetition 2 (encoding)
  (Wayne, Professor)
- repetition 3 (code)
  (Professor)
- repetition 4 (code)
  (Professor)



- repetition 1
  (Madeline)
- repetition 2
  (Wayne)
- repetition 3
  (Lily)

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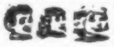
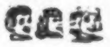
Figure 5

CONTENT TITLE: Series of Unrelated Words MATERIALS NEEDED: Instruction Sheets

OBJECTIVE: To remember facts and names MEMORY RETAINER/BTA LESSON: 6, 7, 8

Rep. #	Directions	Time	Purpose And Modality To Improve	TV Mode	Brain Hemisphere
1.	Orally read series in the worksheet to form an imprint on the mind.	8 Min.	Visual-Sequential Memory		RB-LB
2.	Look at word series on the monitor. Lightly repeat overtly with the faces. Focus on each chunk, who said what. Do not scan forward.		Wholistic Gestalt (faces). Speech-language Area Synthesis Encoding Visualization	Parts 	RB-LB
4.	Focus on each segment, memorizing each component. Class repeats in unison, imitating the three voices.		Analysis Decode Auditory - Visual Integration	Parts 	RB-LB
5.	Continue to covertly repeat, absorbing rhythmic beat of segments. Pull into a whole.		Synthesis Auditory-verbal Memory, Auditory Closure	Wayne drum	RB LB
6.	Repeat covertly and memorize the series.		Analysis Auditory-Sequential Memory	Wayne alone	LB
7.	All repeat sequence in union without the tape		Synthesis Auditory - Sequential Memory	Place monitor on pause	RB-LB
8.	Write the series on paper, repeating covertly to self. Students check their work and repeat a self - affirmation.		Visual-Auditory - Motor Integration		RB-LB

the feature level components (Rumelhart & McClelland, 1986) plus strengthen auditory and visual sequential memory (Erland 1989a, Deschant, 1991; and The Hierarchy of Thinking (Erland,1989c).

4. Math Facts

Developmental learning weaknesses found in arithmetic and mathematical skills are: (l) problem solving, (2) concept formation, (3) language, (4) auditory and visual integration & association, (5) auditory and visual memory, (6) auditory and visual discrimination and closure, and (7) auditory and visual attention (Kirk & Chalfant, l984).

5. Numerical Digits and Mathematical Reasoning

Numerical digits were drilled starting with sequence spans of two and moving to spans of ten. Students learned concentration, attention, and mental manipulation of numerical placement by reciting the spans. This mental agility aids math calculation speed and accuracy (Erland, 1994, 1992, 1989a).

6. Handwriting

Motoric output emphasizing hand-eye coordination was used using Bandura's (1971) modeling framework within his Social Learning Theory. Pre- and posttest writing samples of the Word Fragments subtest of the Detroit Tests of Learning Aptitude offered criterion referenced change comparison benchmarks for each learner.

7. Following Oral Directions, Problem solving, Verbal Analogies, and Study Skills

The ability to follow oral instructions is an integral skill for classroom learning The objective was to follow difficult sequences of procedural information (Stridher, 1988), by accurately and rapidly integrating both visual and listening details (Simpson, 1991; Hammill, 1998, 1985). This activity requires attention, mental organization, and remembering (Gathercole, Peaker, and Pickering, 1998; Manning, 1996).

8. Following Figural Sequences and Analogies

The left hemisphere sequential training is combined with the interpretation and visualization of right hemisphere pictorial figures (Dinsmore, 1991). The elements of these two mental processing styles train language comprehension (Kaufman and Kaufman, 1983).

9. Following Symbolic Processes (notational - letters, numbers, signs, and musical notes)

Encoding and decoding of symbols is fundamental to reading, spelling, handwriting, math and reading music (Meeker 1991, Guilford 1967).

10. Listening to Poetry Repetition

Reciting poetry encompasses listening for details, visualization, and ordering (Anderson, 1993). Auditory and Visual Sequencing is a fundamental component of language skill (Meeker, 1999; Simpson, 1991; Stridher, 1988). It is important to train the mind to focus on phrases of thought (Chomsky, 1988; Atchison, J. 1987).

Method

Overview

This study was conducted with two schools each with their own design. School 1 was a pre-post quasi-experimental design. School 2 was a pre-post experimental design. The effects of cognitive skills and memory training applying accelerated learning methodology were analyzed. The study was to determine if skilled classroom instruction, combined with accelerated learning cognitive skills training,, would improve reading and math academic achievement. Dependent variables were criterion referenced benchmarking, achievement, and cognitive skills tests. The Iowa Test of Basic Skills was routinely administered yearly by both schools as the nationally standardized achievement test measure (Hieronymus, & Lindquist, 1990, 1974).

Pre- and posttest cognitive skills were measured by four subtests on the Detroit Tests of Learning Aptitude-2 (Hammill, 1985). Additionally, four subtests measuring visual and auditory memory were pre-tested with the Woodcock Johnson Psycho-Educational Battery to create a base-line for each classroom.

Eleven experimental elementary parochial school classrooms, grades 4-8, were compared with three control groups: a fourth, a fifth, and a sixth grade. The fourth grade control group had no-treatment, and the fifth and sixth grades received a comparable Alternate Media Activity (AMA).

The ten-week field test was conducted during the fall semester, as there are fewer absences due to illness, and was to be concluded by mid December, or before the Christmas holiday recess.

The prescriptive Experimental Design entailed 48 days of continuous treatment, 30-40 minutes daily, Monday through Friday, using The Bridge To Achievement (BTA) curriculum.

Subjects

The combined two school pre-post experimental and quasi-experimental design study was for students in grades 4 - 8 including all learning levels. Two Midwestern parochial schools, referred to as School 1 and School 2, volunteered to serve in this pilot study.

School 1, a Pre K-8 school, had 97 participating students, grades four to grade eight, and were in intact classrooms, one class per grade level, moving forward each year. School 1 formed the quasi-experimental study.

School 2, a K-8 school, had 172 participating students, grades four to eighth grade with two classrooms per grade. A combined total of 269 participating students represented both schools. Since the schools volunteered to participate in the study before school began, students were randomly assigned following the teacher in-service training. School 2 became an experimental study.

Control groups: There were three control groups. School 1 had a fourth grade no-treatment control/comparison class of twenty-three students. School 2 had two classrooms (a fifth and sixth grade) serving as Alternate Media Activity (AMA) control groups. The fifth and sixth grade AMA control groups had twenty-six and twenty-two students respectively. The three classrooms from the two schools totaled 71 controls.

The students resided in a Midwestern light industrial mid-size city (pop.150,000). They came from mostly Caucasian, middle-class, college-educated parents. Many of the households owned computers.

Demographics:
School #1:

97 of 118 students participated in the study.
Unchurched - 18%, Christian (all denominations) - 82%, Economically disadvantaged - 19%
Minority - 17% (Asian, Afro-American, Hispanic, and other)

School #2:

172 of 190 students participated in the study.
Unchurched: None, Christian – 100%, All denominations accepted; not exclusive
Economically disadvantaged - 8%, Minority - 7% (Asian, Hispanic, and other)

Assessment Instruments and Teaching Materials Used

Cognitive Skill Tests

Eight standardized cognitive subtests from two different batteries were selected to measure each student's abilities. Four subtests were selected from the Detroit Tests of Learning Aptitude - Revised 2 (DTLA-2), (Hammill, 1985), and four subtests were chosen from the Woodcock Johnson Psycho-Educational Battery-1 (WDJ-1). Woodcock, & Johnson, 1977). Five subtests were selected to measure successive processing, and three subtests were chosen to measure simultaneous processing (Kaufman & Kaufman, 1983). Earlier versions of these standardized tests were used to maintain an accurate longitudinal data base begun in 1982, and revised with the addition of the Woodcock Johnson Psycho-Educational Battery in 1985.

The WDJ-1 tests were administered as pretests only to obtain a visual and listening memory baseline for each classroom.

The five subtests measuring successive processing were: DTLA-2 No. 04, Memory for Unrelated Word Sequences; and WDJ No. 03, Memory for Sentences., Auditory Memory For Sentences; WDJ No. 10 Number Reversals; DTLA-2 No. 11 Memory For Letter Sequences; and DTLA-2 No. 03 Following Oral Directions.

The three subtests measuring simultaneous processing were: DTLA-2 No. 10 Visual Closure Word Fragments; WDJ No. 07 Visual Speed Number Match; and WDJ No. 02 Visual Memory

For Spatial Designs. These analyses were based on raw scores, derived from the four subtests giving a composite IQ score.

At the conclusion of the ten-week treatment period, the same cognitive DTLA-1 tests were re-administered to the students. Post-testing procedures, identical to the pretreatment testing, were administered and scored by the classroom teacher. One DTLA-1 subtest, Auditory Memory for Words, was administered individually. DTLA-2 subtests Nos. 3, 10, and 11 were administered as group tests. (See Figure 1, The Level of Processing).

Woodcock-Johnson Psycho-Educational Battery (1977, 1978), Cognitive tests Part I, based upon Woodcock's Level of Processing, 1978 (See Figure 1) has two subtest clusters:

2 & 7 Visual Speed. Reliability .91 with over 4000 subjects
3 & 10 Auditory Memory. Reliability .90 with over 4000 subjects

The Detroit Tests of Learning Aptitude-2, (Hammill 1985)

Subtests: 3 Oral Directions, 4 Unrelated Word Series, 10 Word Fragments, 11 Letter Sequences
Reliability range .86 - .97; Validity range .53 - .74

The Iowa Tests of Basic Skills (ITBS) offers an optional, auxiliary measurement for cognitive skills, called the ITBS-CogAT. This combination test is designed to predict student cognitive skill aptitude and offers a method to identify problems and form a prescriptive treatment. Although School 2 applied the CogAT the year of the study, School 1 did not use it. The CogAT was used to cross-verify the DTLA-2 cognitive skills results.

The CogAT Verbal tests:	The CogAT Quantitative tests	The CogAT Nonverbal tests
• Verbal Classification	• Quantitative Relations	• Figure Classification
• Sentence Completion	• Number Series	• Figure Analogies
• Verbal Analogies	• Equation Building	• Figure Analysis

Achievement Tests.

The thirteen classrooms applied annual student achievement measurement with The Iowa Test of Basic Skills (ITBS), Form K (Hieronymus, & Lindquist, 1990, 1974).
School 1 administered the ITBS in the Spring. School 2 administered the ITBS in the early Fall semester. Previous years' 1996 ITBS test scores were used for comparison pre-posttest with 1997 tests.

Criterion Reference Measures

The data set, large, rich, and complex, consists of the following Criterion Referenced Measures:

- Pre-implementation teacher workshop instruction and supervision of initial cognitive skills pretests.
- 52 site visit observations of each of the thirteen classrooms (four site visits per classroom during the semester-long study).
- 52 target teacher telephone conferences (four per teacher).
- Post-implementation written surveys by thirteen teachers and two site supervisors.
- Pre and Post program interviews with the two principals.
- Ten site supervisor conferences, four with each school, pre, during, and post implementation to review desired modifications and record monitoring.
- Ten telephone interviews with state department of education administrators in four states, three geographical areas.
- Teacher and investigator analyses of student progress by examining daily work, handwriting, and test samples.
- Cognitive skills posttests given by the classroom teachers and evaluated by the investigator.
- Ten written documentation reports: Five to each school to report site visit progress, to the principals and representative school board presidents.
- Ten telephone conferences with the school board presidents, post implementation (five conferences each school).

	Formative	**Summative**	**Longitudinal** (post-training follow-up)
Quantity Measurement (Statistical Data)			
Attendance monitoring		X	X
Classroom observations on task with ***BTA***	X	X	X
Checking completed work samples		X	X
Keeping data folders of work	X	X	
Continuous progress assessment of daily work in student folders		X	X
Pre-post training handwriting samples	X	X	X
Achievement test results	X	X	X
teacher turnover			X
Quality Assurance	X	X	X
case studies	X	X	X
video taping	X		
teacher satisfaction		X	X
student satisfaction		X	X
parent satisfaction		X	X
administrative satisfaction		X	X
principal		X	X

Teacher Training and Student Time Requirements

A two-day teacher training workshop (approximately six hours daily, Friday and Saturday) was conducted for fifteen classroom teachers, and also included the school psychologists, librarians and counselors. Videos of each lesson showing facilitator instruction were also made available for instructional review as needed.

Hardware and Material Requirements for Interactive Learning for All Classrooms

A video monitor and VCR, an audio-tape player, and an overhead projector, one per classroom. The following BTA materials were applied:

1. A teacher training manual.
2. Daily lessons manual with lesson transparencies
3. Four auditory lesson tapes.
4. Five video tapes.

Materials for The Control Group: Alternate Media Activity (AMA) Media List

Name of Product	Author	Company	Video/ Book	Description
Thinkertoys	Michael Michkalko	Ten Speed Press 1991	Book 335 pp.	Thinking skills activities
Crackers & Crumbs	Ed Heinemann, & Sonja Dunn	1990	Video - 2 days 91 Minutes. Also, in paperback ISBN: 043508528X	Chants for Whole Lang./ 91 min video for teachers
Writing Words	Editorial Staff	AIT 1991,Poem & Puzzle, documentary about S.E. Hinton, writer	Video 15 Minutes	Intermediate Wordscape Series, Phonetics, Vocabulary
Writing for Results	Editorial Staff	Cambridge, 1991. Gathering and selecting topics, filing, recording infor, and organizing the paper.	Video 30 Min	For Junior-Senior High School
Study Skills, Getting The Best Results	Editorial Staff	Distributor: Alfred Higgins 1987	Video 20 Min	Vocabulary, organizational tools, proofreading written language
Math: Subtraction	Editorial Staff	Phoenix/BFA 1996	Video 66 Min	Totally Cool Math, Primary, Intermediate
Math: Addition	Editorial Staff	Phoenix/BFA 1996	Video 101 Min	Totally Cool Mathematics, Elementary
Math - Multiplication	Editorial Staff	Phoenix/BFA 1996	Video 97 Min	Elementary Mathematics
Critical Thinking: Seeing is Believing	Editorial Staff	Distributor: Alfred Higgins,1989	Video, 18 Minutes	Drawing correct conclusions, based on facts
Learning to Learn Gr 4-12	Editorial Staff	1990 Duplica Masters	Worksheets	Study Skills
Cognetics: Thinking Skills Activities Gr. 3-12	Judith Burr, T. Gourley, R. McDonnel	Critical Thinking Technology	Book	Research for better schools
ALP Active Listening Program Gr. 5-12	Editorial Staff	Thinking Pub. 1986	Manual and cards	Exercises in listening
Listening Kit Gr. K-5	Editorial Staff	Lingui-Systems 1992	Book, games	Games
Patterns for Hands-on Learning Gr. K-6, Gr. 9-adult	Editorial Staff	National Reading Styles Institute1993	Book	Ideas for teacher implementation in the classroom
Aids To Memory: Note Taking Skills	Editorial Staff	Guidance Associates, 1986	Video, 40 Min	Chronology, cause & effect, important details organize lists
Effective Study Strategy	Ed Reddak	Academic Resources Corp	Video 58 min, 2 days	Organizing homework
Encyclopedia Set	Editorial Staff	Distributor, The Learning Co. Ambrose Video Publishing 1994	set 23 videos each 30 min	Vocabulary lessons in cultural literacy literature
Thinking Your Way to Better SAT Scores	Editorial Staff	PBS Video 1989	Video 2 hrs, 4 days	Study Skills, SAT Prep
Films for Humanities and Literature	Editorial Staff	1988 William Wordsworth poem, "The Daffodils"	15 min Video	Poetry reading

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The Alternate Media Activity (AMA) Reviewed

To match the content of *The BTA*, nineteen media and visual print activities were selected by the researcher and rented from the library of a local Area Educational Agency. There were thirteen different video products including a set of 23-encyclopedia knowledge and vocabulary building videos (Editorial Staff Ambrose, 1994). These products included reading, vocabulary building, reading information, mathematical computational practice, problem solving, study skills, learning techniques, listening activities, writing, language building, critical thinking, memory aids, and pattern-detection activities.

A video-tape was played each day. The implementation focus was on the 23-encyclopedia knowledge and vocabulary building videos, because they were automated and self-taught. The students passively viewed these videos in a darkened room. Occasionally they interacted by writing or speaking.

Parental Involvement

Parents were involved with this study both before and following the sessions. Earlier studies had several successful in process BTA-AL training demonstrations for parents.

There was a "Kick-Off" parent night in which parents reviewed The BTA-AL and Alternate Media Activity materials: books, videos, worksheets, and lessons. Parents then had the choice of participating. Those that wanted to participate signed testing and treatment permission slips.

School 1 offered a parents' follow-up program. Students gave a program enacting the characters and performed the drills. Parents enthusiastically received their students' progress and were receptive to the creative AL teaching application.

Some classrooms featured bulletin boards of the puppet characters that the children drew. Parents who visited the classes informally, positively commented on the art displays that created thematic cross-academic instruction.

Both schools' teachers and students reported that in many cases the parents were practicing the drills themselves at home. Although they did not have the media or software applications, they practiced reciting the various spans with their children as entertainment and family fun.

Training Procedure

The following fifteen *Accelerated Learning and Suggestopedia* principles (Fairbanks, 1992) were applied:

- utilizes speaking in rhythm and vocal intonation, including - slowing the speech rate in presentation of unfamiliar content synchronizing speech patterns to rhythms speaking in short phrases
- applies imagery and visualization
- addresses the physical environment
- uses motivational exercises
- applies positive affirmations
- addresses barriers to learning

- orchestrates playful multi-modal learning
- uses active presentation in learning
- is compatible with how the brain works
- employs creativity
- accommodates diverse learning styles
- empowers, respects and supports learners
- emphasizes relationships and systems thinking
- maximizes utilization of training time
- applies methods of relaxation through creativity and sound patterns

Prescriptive BTA Instruction

Task Analysis: The thirty brain building lessons began at simple levels and progressed to higher levels of memory and cognitive difficulty (Frye and Zelazo 1998; Flower, 1987). The BTA curriculum had been newly reformatted for clarity and purpose, with the objective of making the teaching easier to facilitate. Each lesson had easy-to-follow step-by-step teacher and student instructions designed to simplify the teaching process (Erland, 1994, 1991).

Metacognition and Modeling (Kaplan, 1991). Student self-monitoring of rehearsal practice was integral to the daily lessons. Private speech rehearsal builds cognition and memory (Manning, 1996; Redier, 1996). Students modeled after their peer partner (Alexander and Manion 1997) and self-monitored their "think-say-do" encoding-decoding practice (Gillingham and Stillman, 1970; Fernald, 1943).

Imaginative Character Identities Add Dramatization and Choral Speaking:

Students recited with the celebrity identity voices to dramatize and apply vocal intonation (Lozanov, 1978). According to Manning (1996), self-talk monitoring and practice is a valuable component of learning. It is also Cognitive Behavior Modification guideline (Meichenbaum, 1991) (See Figure 4).

Rhythm and Vocal Intonation with the Exercises

The students stated a self-affirmation then orally read each line in unison using vocal intonation (Lozanov, 1978) to match those of the puppets (Erland, 1989a).

Drill and Practice Defined

Traditionally, drill and practice consist of repeated output trials by the student (Erland, 1989a). The BTA is not merely rote memory drill of simple facts. The program builds on how to encode and decode sequential and simultaneous information by improving memory and cognitive skills through visualization of the material. This creates the agile thinker (Grotzer and Perkins, 1997).

Benchmarking: In-Class Program Criterion-Referenced Measurement and Evaluation:

At the end of the 30-40 minute lessons, students checked their partner's work, and placed the worksheet in their personal folder, dated, with errors carefully tabulated (Alexander and Manion, 1997). At the end of each week, the students reviewed their folders, noting personal performance gains for their own positive reinforcement. Teachers monitored this progress and reinforced learning by showing the improvements to the students and parents (Manning, 1996).

Positive Self-Affirmations:

Students repeated a positive self-affirmation to their partner before and following each lesson. Each partner repeated the affirmation independently with a positive, pleasant demeanor (Manning, 1996). The following self-affirmations may be used:

Self- Affirmations For a Sense of Well-being and Accomplishment

Learning is fun.
I can complete tasks.
I believe in myself and my abilities.
I feel good when my work is done.
I can do it.
I am learning and growing.
I am a winner.
I like to work hard.

Experimental Group Seating:

Desks were in paired units, horizontal rows, squared, or small circles. Grades 6-8 in both schools were seated in traditional rows facing the front.

Control Group Seating.

The fifth grade control group was seated with desks in a square formation. The sixth grade control group had the desks in traditional rows.

Classroom Environment Directed to Learning Styles: Room Lighting:

Grades 6-8 in School 1 had the lights on with the monitor in front. Grade 6E3 had the monitor in the front corner of the room with only fair visibility due to the small size of the room. Classrooms 6E1, 4E3 & 5E3 had darkened rooms when the monitor was on, and lighted the remaining time. Grades 4E1, 4E2, and 5E1 had lighted rooms. The control groups alternated activities between lighted and darkened rooms.

Time of Day:

All classrooms taught the BTA or AMA in the morning. The time allocation was varied between various academic subjects for the 30-40 minute training session.

The BTA Nineteen Executive Criteria Measures.

1. All lessons should be taught according to scope and sequence for 48 consecutive days (24 hours of training, Monday through Friday), according to time and task.
2. Student attendance and active participation were mandatory. Students absent more than seven days were to be removed from the study. Students should not be removed from the class for other Special Services instruction during the training.
3. Trained Substitute teachers were to be used when teachers are absent.
4. All lessons, and lesson items, should be taught in proper sequence, without skipping or doubling any lessons.
5. Recitation applied according to self-rehearsal with metacognitive private speech requirements.
6. Vocal Intonation and role-playing applied by the students.
7. All lessons taught according to instructional lesson plan and procedure.
8. Students work in partners or triads.
9. The BTA instructional lesson plan concordance system applied according to policy.
10. Pattern detection instruction applied.
11. Visualization techniques applied.
12. Peer models engaged.
13. Rhythm, kinesthetic motion, and dramatization applied.
14. Maintain students' rapt attention and engagement in the activity.
15. Latin Roots lesson rehearsal applied.
16. Positive self-affirmations.
17. The teacher giving positive examples of rationale for each activity enthusiastically.
18. Seating rotated so the video monitor was in close proximity for all students in varying schemas.
19. Room lighting consistent, with the monitor visible. Room heating at a comfortable setting.

Policy Adherence Requirements for Successful Curriculum Implementation

According to implementation policy, each school was to select a certified lead teacher, preferably at the masters' educational level, to conduct daily classroom site support. Accountability was to be documented in regular written and verbal monthly site visit reports.

School 1 selected a part-time Life Skills teacher to serve as supervisor and substitute instructor for the 7E3-class. School 2's first-year principal, although having additional administrative requirements, elected to serve as Site Supervisor.

The following policy adherence issues were evidenced by the experimental classrooms in site visit documentation:

Due to time constraints, the site supervisors for each school submitted verbal documentation reports although both verbal and written notations were requested for continuous benchmarking.

The BTA was taught for 48 consecutive days in only two of the eleven classrooms, 4E3, and 4E2. The other nine experimental classrooms taught the BTA for shortened 36-42 days.

Furthermore, typically teachers have decision-making authority of "what to use, not to use, or how to use materials" when applying commercial products. This sense of autonomy becomes ingrained in using any product, although in this instance, they were instructed to use a prescriptive executive criteria lesson plan according to scope and sequence, time and task.

Eager to complete the cognitive skills-AL training with facility, critical BTA curriculum lessons were often randomly eliminated while others were doubled. When items were cut from lessons, daily training sessions were shortened. Some days were not taught due to extra curricular activities. However, the Alternate Media Activity (AMA) instruction was taught as prescribed with a daily video lesson for 48 consecutive days.

Student work samples were collected and evaluated during site visitations, so important improvement tracking was nevertheless carefully benchmarked.

The 7E3 and 8E3 classes eliminated accelerated learning and BTA procedural methods except those that were automated within the BTA. It was recommended in mid-program documentation letters to the administration, that the lagging 7E3- and 8E3-classes be combined and taught either with the 6E3 class, which was being taught AL prescriptively, or combined and taught as a unit with two additional support co-teachers.

Substitute teachers were not garnered for teacher absences in School 2. At least one teacher, 6E1, had a one-week mid-program loss of BTA treatment due to her absence, affecting potential auditory memory gains (listening and comprehension). Moreover, a lack of auditory gain would lead to incomplete training transfer and longitudinal achievement score maintenance. Furthermore, this teacher also began the first month instructing only three out of the prescribed five days, not realizing she was in error.

An experimental eighth grade teacher in School 2 took a leave of absence due to illness and was replaced with an untrained instructor. Therefore, this class was removed from the study. Two other eighth grade classes were eliminated because the ITBS posttests were not available when the students advanced to a parochial high school.

These irregularities became apparent during site visits and in telephone review sessions with the classroom teachers during and following implementation. To ensure completion of the study, and reveal the effects of the executive criteria measures, training was prescriptively monitored with monthly documentation reports to the administration.

Other accelerated learning research indicates that there can be positive results even if the teachers implement the accelerated learning methods 50% of the time or more (Schuster & Gritton, 1986). Outcome results in this study were weighted according to degree of compliance. Evaluation to measure compliance with the nineteen executive criteria was made on teacher checklists through site observations and telephone review sessions.

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Results

School 2s 172 participating students were randomly assigned (grades 4-8), as experimentals (Es) and controls (Cs), before school began in the fall, and following the teacher training. This formed an Experimental design. Two control groups, receiving an alternate media activity, were also randomly assigned in grades 5 and 6. Control group classes were limited in this school to two classrooms, because the junior high classes in School 2 had complex rotation scheduling, making it difficult to assign control groups.

School 1 (97 participating students) formed a quasi-experimental study. It had a control/ comparison group because a set of data from a subsequent fourth grade class became available. This control group received no treatment, and did not have program site visitations. This teacher did not have the accelerated learning training, so accidental contamination was not possible.

Achievement Tests.

Iowa Tests of Basic Skills (ITBS) standard score means on each of thirteen out of a total sixteen primary subtests were analyzed for comparisons with the fifth- and sixth-grade control groups. The standard score means of the following primary subtests were included: Composite, Reading Comprehension, Vocabulary, Reading Total, Math Concepts, Math Problem Solving, Math Total, Math Computation, Language Total, Spelling, Core Total (Reading, Math, and Language composite), Social Science, and Science. The three Language subtests of Punctuation, Capitalization, and Usage subtests were analyzed only when the added information was applicable.

Since the seventh and eighth grades did not have control groups, the national norms standard scores (SS) were comparisons for these grades. Standard scores for each of the subtests were derived from the raw scores (ITBS Technical Summary, Riverside 2000, 1994). Appropriate standard scores were used from the technical manuals (Hoover, H. D., et al, 1993). Standard Score point differences (DSSs) were calculated for each class and each academic subject.

These standard scores were based on what time of the year each school gave the ITBS. School 1 gave the ITBS tests in the spring. For this school, the National Norms were computed fall to spring, as that was inclusive of when the treatment was conducted, Fall to early Spring.

School 2 gave their ITBS tests in the fall. The students were tested with the ITBS before the onset of the BTA /AMA Fall treatments, and then re-tested the following fall. Therefore, fall to following fall ITBS norms were used for this school.

The ITBS Spring Median DSSs from the Riverside 2000 Technical Summary are shown below for School 1 (p.70):

Grade	Median	Gain
4	200	14
5	214	14
6	227	13
7	239	12
8	250	11

Thirteen academic subject tables were created, one for each of the thirteen primary ITBS subtests, out of a total of sixteen. Each table listed corresponding numbers of students, standard scores, standard score point differences, (DSSs) and standard deviations (S.D.) for the experimental groups, the ITBS norms, and the control groups (See Table 1).

Classrooms were labeled experimentals and controls, E & C, and by school. School 1 was experimental 3, or E3. School 2, with two classrooms per grade, were labeled experimental 1 & 2, or E1, and E2. The control groups were labeled as 5th and 6th grade controls. In labeling, the grade year precedes the treatment number E1, E2, and E3. For example, the fourth grades were listed as 4E1, 4E2, and 4E3.

Standard scores means were computed by SPSS a statistical computer software program. T-tests on gains were calculated both manually and with software programs for each grade for each subtest, with significance levels of .1, .05, and .01 (Winer, 1971).

Due to the inconsistent implementation procedures and policy adherence among the classrooms, t-tests would show the degree of internal results outcome specific to each classroom. With the wide variance in teacher application, a Multiple Analysis of Covariance (MANCOVA) analyses was therefore inappropriate for inter-classroom comparisons.

A table of Norms was created (See Table 2) to depict how the classroom standard score point differences compared to the norms. The standardized Norms table compares the treatment and controls to the National Norms. The Norms figure is the second number on the table under NN (National Norms). These NN figures vary within the same grades because the schools conducted the testing at opposite times, fall and spring.

The two fourth grade classes in School 2 fell below the National Norms (See Table 2). However, when pooled with the strong 4E3-classroom, and compared to the National Norms, these three fourth grade classes trended some significant gains in the Composite, Reading Total, Vocabulary, Reading Comprehension, Math Total, Language Total, Core Total, and Spelling subtests at the .01 and .05 levels. Math Concepts, Problem Solving, and Computation are most directly affected by misapplication.

Table 2 reveals that the controls' solid gains beat the norms in all but one instance, the 5th grade control group in Social Science. The 8.26 score is below the comparative 5E1 Norm of 14.

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The eleven experimental classrooms had gains 79% greater than the norms (See Table 1).

Table 3 reveals the eleven experimental classrooms' and two control groups pre- to posttest mean point difference scores as compared to the national norm expectations. The mean score point difference is the left figure, and the right figure, is the national norms gain expectations. The fourth-grade control group class is not on the table as ITBS pretest scores were not available, so therefore DSS scores could not be calculated.

The experimental classrooms had strengths in 90 subtest areas, either matching or greater than the robust controls (or norms for grades 4, 7, and 8), and scored significantly higher in 65 academic subtests. Both the experimental and the control groups evidenced solid gains. Although Table 3 shows the vocabulary subtest with fewer classrooms with point difference score gains than the tabulated significant results indicate, this is because of the pooling of grades four and six against the norms giving these classes subsequent statistically significant gains.

Table 4 shows pre to posttest statistically significant gains of the experimental classes versus the control groups. Additionally, the mean point differences on the ITBS for the academic subjects that matched the controls' gains are shown in comparison to the National Norms (NN). The experimental classes' statistically significant gains are indicated for each academic subtest.

The results are layered according to policy adherence of the executive criterion measures. The bottom row tallies the number of academic subjects that matched the robust control group gains, with the number of statistically significant gains on the right.

This study demonstrated a four-tiered result outcome effect, depending on implementation practice that ranged from ideal to poor. It demonstrated how teacher commitment, follow-through, and methodological knowledge affect the quality of performance.

The four levels are described as follows: (See Table 4).

Ideal Conditions include a committed teacher achieving outstanding results in small, carefully controlled group settings by applying all of the criteria most of the time daily for thirty to forty minutes. Former highly successful studies by this researcher and other committed teachers serve as the baseline for observing ideal scientific conditions (Erland, 1994, 1992, 1989a 1989b).

Good Conditions include diligent classroom teachers who followed most of the Nineteen Executive Criteria, applied the accelerated learning strategies, and successfully obtained positive results (Erland, 1994, 1992)

Fair Conditions include classroom teachers who followed some of the Nineteen Executive Criteria receiving limited results. A baseline of fair conditions requires only that 50% of the criteria be applied for two to three months.

Poor Conditions include classroom teachers who typically cut too many lessons, items, and days, eliminated accelerated learning strategies, and thereby received limited results.

Table 1.

ITBS Composite

One of Thirteen Academic Subject Tables

Depicting the Standard Score Point Differences (DSSs) for Each Classroom (experimentals and controls)

Grades 5 & 6 were compared against same grade control groups and without pooling of the grades

At the time of this analysis, a 4th grade control/comparison group did not exist.

Grades 4, 7, and 8 are analyzed with the standardized norms (1000 students)

	Nat'l Fall to Fall Norms	SD	Pt. Diff	Controls			E1			E2			Nat'l Fall to Spring Norms	SD	Pt. Diff	E3		
	Mean V/Q/NV			Mean	SD	PT Diff	Mean	SD	Pt Diff	Mean	SD	PT Diff				Mean	SD	PT Diff
							N = 24 df = 23	10.29	t=1.25	N = 20 df = 19	11.45	t=1.07		22.33		N = 14 df = 13	10.19	t=3.47**
4th Pre	175.94	16.46		None			199.16	20.29		206.40	22.61		192.12	21.15		202.57	17.99	
4th Post	192.12	21.15	16				213.04	24.01	13.89	219.19	26.64	13.50	202.72	22.86	10	229.43	22.72	26.86
				N = 26 df = 25	12.09		N = 25 df = 24	9.41	t=0.79							N = 25 df = 24	7.88	t=0.63
5th Pre	192.12	21.15		219.73	20.20		224.88	23.96					207.75	24.63		218.56	18.09	
5th Post	207.75	24.63	16	239.03	24.58	19.30	246.60	23.74	21.72				216.94	26.51	9	236.04	19.54	17.48
				N = 22 df = 21	8.02		N = 21 df = 20	9.03	t=0.29							N = 19 df = 18	5.16	t=2.81**
6th Pre	207.75	24.63		237.45	22.51		243.90	25.57					221.72	28.92		247.47	16.92	
6th Post	221.72	28.92	14	255.47	23.88	17.81	260.95	24.25	17.04				229.56	29.98	7.8	271.31	18.29	23.84
				None			N = 20 df = 19	21.94	t = 0.78	N = 19 df = 18	11.12	t=2.03*				N = 25 df = 24	9.20	t=2.27*
7th Pre	221.72	28.92					266.60	16.17		255.26	22.81		233.37	31.56		273.76	15.65	
7th Post	233.37	31.56	12				280.95	23.64	14.35	270.36	23.44	15.10	240.89	32.59	7	284.76	18.44	11.00
				None												N = 14 df = 13	12.30	t= 1.36
8th Pre	233.37	31.56											243.93	33.90		256.92	29.27	
8th Post	243.93	33.90	10										250.87	34.56	7	271.35	26.88	

† Sig. p < .1 * Sig. p < .05 ** Sig. p < .01

Table 2.

ITBS Academic Subject Comparisons of BTA
Pre- to Posttest Point Standard Score Differences (SSDs)

Compared to National Norm Expectations; BTA Gains 79% Greater than the National Norms

Eleven Experimental Groups with Two Control Groups

CLASS	Composite	Read Total	Vocab	Read Compr	Math Total	Math Concepts	Math Prob Solv	Math Computa	Lang Total	Spell	Core Total	Social Science	Science
	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA- NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN
4th E3	26.86 - 7	24.50 - 9	20.64 - 9	28.14 - 9	22.64 - 12	16.51 - 12	28.93 - 11	30.07 - 13	33.92 - 12	31.28 - 13	27.21 - 11	19.57 - 9	38.86 - 9
6th E3	23.84 - 4	15.00 - 7	13.10 - 7	17.84 - 7	21.78 - 10	23.26 - 10	20.68 - 8	46.47 - 11	25.57 - 8	18.36 - 8	21.05 - 8	31.31 - 7	32.47 - 7
5th E1	21.72 - 9	17.16 -13	13.72-14	20.48 - 13	23.04 - 14	18.72 - 14	27.48 - 15	33.12 - 15	35.64 - 14	23.04 - 15	25.28 - 14	18.28 - 14	16.60 - 14
6th E1	17.04 - 7	16.04 - 12	16.28 - 12	15.71 - 10	25.90 - 13	21.66 - 13	30.14 - 12	21.09 - 13	27.38 - 12	20.95 - 12	23.14 - 12	[illegible]	17.14 - 11
8th E3	14.42 - 3	11.64 - 6	7.71 - 6	15.87 - 7	11.07 - 7	13.64 - 9	9.14 - 6	16.28 - 9	17.78 - 6	22.78 - 8	13.50 - 7	12.35 - 7	19.07 - 11
4th E1	13.89 - 11	10.62-14	[illegible]	[illegible]	16.04 - 15	20.37 - 15	11.62-15	[illegible]	15.41-16	[illegible]	[illegible]	[illegible]	22.79 - 16
4th E2	13.50 - 11	13.85-14	16.45 - 15	11.15.14	11.25-13	12.05 15	10.30 15	15.35 - 15	19.20 - 16	20.50 - 17	14.95 - 15	[illegible]	15.25.16
7th E2	15.10 - 6	14.73 - 12	19.00 - 11	[illegible]	11.84 - 11	12.57 - 11	11.47 - 11	[illegible]	17.57-11	28.27 - 10	14.78 - 11	20.26 - 10	7.10.10
7th E1	13.60 - 6	17.13 - 12	19.40 - 11	14.93 - 10	10.40 - 11	12.00 - 11	[illegible]	17.80 - 12	13.20 - 11	15.40 - 10	13.46 - 11	16.73 - 10	12.40 - 10
5th E3	17.48 - 6	12.72 - 8	13.16 - 8	12.44 - 8	13.60 - 14	15.64 - 11	11.28 - 10	16.00 - 13	16.96 - 10	19.04 - 10	14.52 - 10	22.84 - 8	25.04 - 7
7th E3	11.00 - 4	7.64 - 7	7.68 - 7	7.80 - 8	7.76 - 8	4.12-9	11.24 - 8	10.28 - 10	9.17 - 8	15.76 - 7	8.16 - 8	10.36 - 7	14.36 - 7
6th Contrl	17.81	15.27	14.86	15.13	16.45	14.68	18.72	25.13	26.90	23.40	19.54	15.68	22.81
5th Contrl	19.30	19.03	19.69	19.03	23.65	23.23	23.80	23.42	28.38	21.92	23.69	8.26	25.76

The right figure in each cell is the norm, which was rounded up to a whole number for readability

☐	BTA Pt. Differ Scores GREATER than the Norms
▤	BTA Pt. Differ Scores MATCHING the Norms
■	BTA Pt. Differ Scores BELOW the Norms

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Table 3.

ITBS Academic Subject Comparisons of Experimental Gains: Classrooms are in rows
Point Differences of Standard Score Means, (DSSs) and ITBS National Norm Expectations
Eleven Experimental Groups Comparisons with Two Alternate Media Activity Control Groups

	Composite	Read Total	Vocab	Read Compr	Math Total	Math Concepts	Math Prob Solv	Math Computn	Lang Total	Spell	Core Total	Social Science	Science
CLASS	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA- NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN	BTA - NN
4th E3 **N = 14**	26.86 - 7	24.50 - 9	20.64 - 9	28.14 - 9	22.64 - 12	16.51 - 12	28.93 - 11	30.07 - 13	33.92 - 12	31.28 - 13	27.21 - 11	19.57 - 9	38.86 - 9
6th E3 **N = 19**	23.84 - 4	15.00 - 7	13.10 - 7	17.84 - 7	21.78 - 10	23.26 - 10	20.68 - 8	46.47 - 11	25.57 - 8	18.36 - 8	21.05 - 8	31.31 - 7	32.47 - 7
5th E1 **N = 25**	21.72 - 9	17.16 - 13	13.72 -14	20.48 - 13	23.04 - 14	18.72 - 14	27.48 - 15	33.12 - 15	35.64 - 14	23.04 - 15	25.28 - 14	18.28 - 14	16.60 - 14
4th E1 **N = 24**	13.89 - 11	10.62 - 14	10.92 - 15	9.83 - 14	16.04 - 15	20.37 - 15	11.62 - 15	9.16 - 15	15.41 - 16	15.70 - 17	13.70 - 15	7.91 - 15	22.79 - 16
4th E2 **N = 20**	13.50 - 11	13.85 - 14	16.45 - 15	11.15 - 14	11.75 - 15	12.95 - 15	10.50 - 15	15.35 - 15	19.20 - 16	20.50 - 17	14.95 - 15	6.45 - 15	15.25 - 16
6th E1 **N = 21**	17.04 - 7	16.04 - 12	16.28 - 12	15.71 - 10	25.90 - 13	21.66 - 13	30.14 - 12	21.09 - 13	27.38 - 12	20.95 - 12	23.14 - 12	6.71 - 11	17.14 - 11
7th E2 **N = 19**	15.10 - 6	14.73 - 12	19.00 - 11	8.63 - 10	11.84 - 11	12.57 - 11	11.47 - 11	5.89 - 12	17.57 - 11	28.27 - 10	14.78 - 11	20.26 - 10	7.10 - 10
7th E1 **N = 15**	13.60 - 6	17.13 - 12	19.40 - 11	14.93 - 10	10.40 - 11	12.00 - 11	8.80 - 11	17.80 - 12	13.20 - 11	15.40 - 10	13.46 - 11	16.73 - 10	12.40 - 10
8th E3 **N = 14**	14.42 - 3	11.64 - 6	7.71 - 6	15.87 - 7	11.07 - 7	13.64 - 9	9.14 - 6	16.28 - 9	17.78 - 6	22.78 - 8	13.50 - 7	12.35 - 7	19.07 - 11
5th E3 **N = 25**	17.48 - 6	12.72 - 8	13.16 - 8	12.44 - 8	13.60 - 14	15.64 - 11	11.28 - 10	16.00 - 13	16.96 - 10	19.04 - 10	14.52 - 10	22.84 - 8	25.04 - 7
7th E3 **N = 24**	11.00 - 4	7.64 - 7	7.68 - 7	7.80 - 8	7.76 - 8	4.12 - 9	11.24 - 8	10.28 - 10	9.17 - 8	15.76 - 7	8.16 - 8	10.36 - 7	14.36 - 7
6th Contrl **N = 22**	17.81 7	19.27.12	14 86 12	15.13.10	16 49 13	14.68.13	18.72.12	25.13 13	26 90.12	23 40 12	19.54 12	15.68.11	22.91.11
5th Contrl **N = 26**	19.30 9	19.03 13	19 69 14	19 03 13	23 69 14	23 23 14	23 80 15	23.42.15	28.58 14	21 92.15	23 69 14	8 26.14	25.76 14
# Sig. Gains	8	6	6	3	5	1	2	3	7	7	7	7	3

Note: Each figure of Standard Score Mean Pt. Differences (DSSs) is followed by the National ITBS Norm (ITBS Fall & Spring Tables). Expectations
The experimental classrooms show significant gains in 65 academic subjects over the controls / norms.
Number of Sig. gains is in the final row (See Table 4).

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Table 4.
ITBS Academic Subject and Classroom Comparisons

The degree by which the teachers followed the 19 Executive Criteria Measures – Four Success Levels – Ideal, Good, Fair, to Poor
Shaded areas = Classrooms are in horizontal rows with 90 academic subject gains matching or greater than the controls and norms, 65 academic subjects are statistically significant for the experimental groups / norms and controls

Class-room	Followed Executive Criteria 1/19 & Differential Weights	Composite	Read Total	Vocab	Read Compr	Math Total	Math Concepts	Math Prob Solv	Math Computa	Lang Total	Spell	Core Total	Social Science	Science
4th E3	98%-98%	** collectively	** →	**	**	**	**	** *	**	**	**	**	**	**
6th E3	77%-73%	**	15.00 - 7		17.84 - 7	† Pooled	23.26 - 10	20.68 - 8	**			21.05 - 8	**	32.47 - 7
5th E1	70%-70%	21.72.9			20.48.13	23.04.14		27.48.15		35.64.14	23.04.15	23.28.14		
4th E1	63%-68%						20.37.14						Pooled ↔	
4th E2	54%-63%	*	**	Pooled * ↔	**	*				**	**	**	Pooled ↔	**
8th E3	50%-54%	*			15.87 - 7				16.28 - 9	**	**	*	12.35 - 7	19.07 - 11
6th E1	50%-53%		16.04 - 12	16.28 - 12	15.71 - 10	*	21.66 - 13	†		27.38 - 12		23.14 - 12		
7th E2	43%-50%	*	**	Pooled ** ↔						*	**	Pooled ** ↔	**	
7th E1	40%-43%	**	Pooled ** ↔	**						*	**	Pooled ** ↔	**	
5th E3	30%-36%													25.04.7
7th E3	25%-30%	*	Pooled ** ↔	**						Pooled * ↔	*	Pooled ** ↔	**	
6th Contrl		17.81	15.27	14.86	15.13	16.45	14.68	18.72	25.13	26.90	23.40	19.54	15.68	22.81
5th Contrl		19.30	19.03	19.69	19.03	23.65	23.23	23.80	23.42	28.38	21.92	23.69	8.26	25.76
# of Gains		9- 8	8- 6	7 - 6	7 - 3	6 - 5	4 - 1	4 - 2	4 - 3	9- 7	8 - 7	10 - 7	8 - 7	6- 3

Note: The academic subjects matching the controls show the pre- to post-test standard score point differences (DSSs), followed by the national norms expectations. The final tally row includes academic totals of subjects, which closely matched the controls followed by the number of academic subjects that were statistically significant over both norms and controls.

† Sig. p < .1   * Sig. p < .05   ** Sig. p < .01

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The classrooms' site visitation checklists were analyzed according to implementation factors of the executive criterion measures. They were 1) assigned a percentage reflecting compliance with the equally weighted 19 in-classroom criterion measures (1/19 or 5.3 points for each criterion), and 2) assigned a percentage reflecting criterion measures weighted according to their qualitative influence on ITBS score outcomes.

The 4E3 experimental classroom of fourteen students (N=14) was compared to the 4th grade control group of 23 students. Two reading and two math areas were significant: Reading Total, $p < .05$, and Reading Comprehension, $p < .01$; Math Concepts and Math Computation, $p < .1$ level.

Additional analysis was made to look at treatment trending. Using the exact binomial probability test as given by McNemar (1962), when pooled collectively, the experimentals had averages higher than the controls on ten out of eleven remaining dependent variables after excluding the five Total subtests (Reading, Math, Core, Language, and Composite) (See Table 4). Furthermore, when the 4E3 five total subgroups were analyzed independently against the norms, they also all reached significance at the .01 level. The Reading Total subtest was significant against both the norms and controls, and also when pooled.

These ten dependent variables were significant at $p < .01$, with the exception of Math Concepts, $p < .1$. Individually, two out of the three language subtests, Punctuation and Usage, were also statistically significant $p < .01$. Only one Language subtest of the sixteen, Capitalization, was reversed, $t = - 0.03$ (McNamar, 1962). (See Table 5).

The classroom with the second strongest gains, 6E3, complied with the criteria measures 73%-77%. This class had four significant subtests: Composite $p < .05$, Math Computation $p < .01$, Math Total $p < .1$ (pooled against the controls) and Social Science $p <.01$.

These top two classrooms (4E3 and 6E3) collectively had strengths in 23/26 academic subject areas for an 88% success rate, with 65% (17/26) of the academic subjects statistically significant. The top three classrooms (4E3, 6E3, and 5E1) collectively had strengths in 32/39 academic subject areas for an 82% success rate. The top four classrooms (4E3, 6E1, 5E1, and 4E1) collectively had 42 strengths out of 52 academic areas for an 81% success rate. These top four classrooms followed the executive criteria measures 63%-98% successfully.

The top seven classrooms that followed the executive criteria measures at least 50% of the time had a 47% success rate. These figures clearly indicate a strong positive correlation between following the criteria measures and accelerated learning resultant outcomes. These success rate percentage figures are implicit in Table 4.

With the ITBS Composite subtest, eight of the eleven experimental classrooms had significant gains over the controls or norms. Additionally, the three seventh grade classes were significant at $p < .01$, $p < .05$, and $p < .1$ levels in comparison with the national norms and the 5E3 class was significant at the $p < .05$ level. Therefore, even the most incomplete BTA-AL applications evidenced gains. Table 4 reveals that the academic subjects acutely affected by program misapplication were reading comprehension, the math subtests, and science.

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Benchmarking: Criterion Referenced Measures.

Observation checklists documented the teacher's instructional actions, behaviors, and thoroughness in following the training prescription during site monitoring visits. That is, the observation checklists revealed how closely teachers followed the lesson plans with their accompanying teaching style and behaviors. Analysis of the variations in classroom applications of the executive criteria and the corresponding ITBS score outcomes led to the final criteria weighting.

Student - teacher behaviors and attitudes, partnering-modeling activities, and learning progress were also monitored and benchmarked accordingly on checklists. These observation checklists served as on-going criterion referenced documentation of teacher and student progress.

The experimental student outcomes in this study were analyzed against both the national norms and controls. Seventh and eighth grade classrooms were compared with the norms. Data from the fourth and seventh grade classrooms were pooled by grade and compared against the norms. The fourth grade from School 1, and the fifth and sixth grade experimentals were then compared individually against their corresponding control groups, and they were also pooled and compared against the norms.

Gains Summary:

The hypothesis was met in that of the six of eleven experimental classrooms had significant gains in reading and math (See Tables 4 and 6). Seven classrooms, had statistically significant Core Total scores ($p < .05$ and $p < .01$) which includes Reading, Math, and Language. Only one classroom of the eleven, 8E3, lacked significant reading and math gains. Yet this 8E3 class had a significant gain in Core Total, which includes reading and math. The experimental classrooms evidenced the following gains statistically significant over the norms, and equal to or greater than the robust control groups:

- Core Total (ten/eleven classrooms with large gains, seven statistically significant, $p < .01$ (6),
- $p < .05$, (1)
- Reading Comprehension (seven/eleven classrooms with large gains; three statistically significant,
- $p < .01$)
- Vocabulary (seven/eleven classrooms with large gains, six statistically significant, $p < .01$ (4),
- $p < .05$, (2)
- Reading Total, (eight/eleven classrooms with large gains, six statistically significant, $p < .01$)
- Problem solving (four classrooms with large gains; two statistically significant, $p < .1$, $p < .01$)
- Math Concepts (four classrooms with large gains; one statistically significant, $p < .01$)
- Math Computation (four classrooms with large gains; three statistically significant, $p < .01$ (2), $p < .05$, (1)
- Math Total (six classrooms with large gains, five statistically significant at $p < .1$ (1), $p < .01$ (1), $p < .05$, (3) (See Tables 4 and 6).

Table 5. Grade 4 (4E3) immediate posttest standard score data,
Experimentals (N=14) vs. Controls (N=23)

	Composite	Reading Vocab.	Reading Compre.	Read. Total	Math Concep.	Math Problems
Experimentals						
Ave.	229.43	223.14	236.86	230.07	221.93	235.93
S.D.	22.73	22.18	23.22	21.84	20.02	22.51
Controls						
Ave.	220.30	213.17	220.35	216.78	210.91	231.04
S.D.	16.98	20.20	17.59	17.64	16.92	27.47
t:	1.39	1.40	2.45**	2.03*	1.79+	0.56

	Math. Tot.NSS	Math. Comput.	Spelling	Capital.	Punctua.
Experimentals					
Ave.	228.79	221.57	222.64	236.14	237.21
SD.	19.44	15.32	22.98	25.55	28.30
Controls					
Ave.	220.87	210.39	217.39	236.48	229.09
S.D.	20.54	20.41	26.32	34.44	34.59
t:	1.16	1.77+	0.62	-0.03	0.74

	Usage	Lang.Tot.	Core Tot.	Soc.Stud.	Science
Experimentals					
Ave.	246.00	235.43	231.50	221.86	231.50
S.D.	26.94	20.21	18.45	28.70	38.30
Controls					
Ave.	236.74	230.00	222.57	210.35	222.91
S.D.	26.42	26.10	18.25	15.09	25.70
t:	1.03	0.67	1.44	1.60	0.82

Significant levels of * $p < .05$, **: $p < .01$, † $p < 0.1$,

. Table 6. Summary Chart of Significant Gains for Grades 4-8

Classrooms are by grade and school, grades 4-8.	N	E & C, 11 subtests analyzed collectively, and 16 subtests analyzed independently	E & Norms, 13 subtests analyzed	Pooled by Grade, E & C, 9 primary subtests	Pooled by Grade, E & National Norms Analyzed: 3-Reading subtests,, 4-Math subtests, Composite & Core Total
Grade 4E3,	14	Collectively with Controls: V, ** RC, ** MCT, ** MPS,** MC,** S,** Cp** U, ** P, ** SS, ** SC** Independently: RC,** RT, * MCT,† MC,† LT **	Com,** V,* RT,* * RC,** MPS, * MC,* LT, ** SS,† CT,** S**	Not Analyzed Controls for E3 school only	Com,** CT ** V,* RC,* RT,** MT,* LT,** S,** SC **
Grade 4E1,	24	No Controls	No Significant Results	No Controls	Com, ** CT ** V,* RC,* RT,** LT,** S,** SC, **
Grade 4E2,	20	No Controls	No Significant Results	No Controls	Com, ** CT ** V,* RC,* RT,** LT,** S,** SC **
Grade 5E1,	25	MC,* SS,†	Not Analyzed	SS*	Com,** RC,** RT,** CT, * MC,** MP,** MT,† MCT, ** LT, ** SS,** S,**
Grade 5E3,	25	Com, ** SS,** CT,*	Com,** V,* RT,* MCT,† S,** LT,** CT,** SS,** SC**	SS*	Com, ** RC, ** RT, ** CT, * MC, ** MP, ** MT,† MCT,** LT,** SS ** S,**
Grade 6 E1,	21	MT,* MPS,†	MCT,** MPS,** MT,** MC,*	MT,†	Com,** V,** RT, † RC,** CT,** MC,** MPS,** MCT,** MT,** LT,**
Grade 6 E3,	19	Com,* MC,** SS,**	Com, ** V,* RC,* RT,* MCT,** MPS,* MT,** CT,** MC,** S,* LT,** SS,** SC **	MT,†	Com,** V,** RT, † RC,** CT,** MC,** MPS,** MCT,** MT,** LT,**
Grade 7E1,	20	No Controls	No Sig. Gains	No Controls	Com, ** V, ** RT,** CT,** SS,** LT,* S,**
Grade 7 E2,	19	No Controls	Com *	No Controls	Com, ** V, ** RT,** CT,** SS,** LT,* S,**
Grade 7 E3,	25	No Controls	Com,* S*	No Controls	Com, ** V, ** RT,** CT,** SS,** LT,* S,**
Grade 8E3,	14	No Controls	Com, * LT,** CT,* S**	No Controls	Pooling data not available

† Sig. p < .1.
* Sig. p < .05
** Sig. p < .01
*** Sig. p < .02
E = Experimentals
C = Controls

Subjects listed as: Com = Composite, V = Vocabulary, RC = Reading Compre, RT = Reading Total, MCT = Math Concepts, MPS = Math Problem-Solving, MT = Math Total, MC = Math Computation, LT = Language Total, U = Usage, P = Punctuation, Cp = Capital., S = Spelling, CT = Core Total, SS = Social Science, and SC = Science

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Cognitive Skills Analysis.

The experimental BTA treatment focused on the foundational cognitive skill components within reading and math (Meeker, 1991; Guilford, 1967). The BTA training exercises were based on accelerated learning principles with the Hierarchy of Thinking (Erland, 1989c), and on formerly successful training applications (Erland, 1994, 1992, 1989a) of accelerated learning (Lozanov, 1978).

Reading and math gains consistent with those measured earlier by Science Research Associates Tests (SRA, 1985) were predicted for this study. The BTA training group was expected to evidence achievement gains in reading and math beyond the gains made by the Alternate Media Activity (AMA) group.

Consistent with predictions, experimental multimedia trained BTA students evidenced greater improvement than did control AMA students on all DTLA-2 cognitive skill tests as verified by the ITBS-CogAT. Cognitive skill results were also compared with former studies and control groups (Erland, 1994, 1992, 1989a, 19989b). See Figure 6.

The Woodcock Johnson (1978) visual perceptual speed and auditory memory subtests were also given as pretest measures to form a baseline percentile indicator for each classroom (Massi, 1993).

The raw score mean Intelligence Quotient (IQ) pre to posttest gain for the eleven classrooms was eighteen points, with sixteen points as a median score (See Table 9). A former fifth grade study, 5ELinc, (Erland, 1994) reported a mean IQ gain of twenty-four points. By contrast, the fifth grade controls from School 2 had a six point average IQ gain, and a fifth grade former control group had a two point mean IQ gain.

Word Fragments, a visual closure test, showed perceptual improvement gains by all classrooms. The DTLA-2 (Hammill, 1985) Word Fragments, visual closure subtest No. 10, showed a mean of +4.64 raw score point gain compared to the fifth-grade control group of - 1.38 point gain and a former study's control groups mean score of +1.20 raw score point change. The 4E3-class which conducted the study correctly, had a +8.06 mean raw score point improvement. The two fourth-grades (4E1 and 4E2 classes) which fell below the norms on the ITBS achievement test, had good visual closure improvement: the 4E1-class with a mean of +5.13 raw score point gain , and the 4E2-class with a mean of +7.50 raw score point gain. The Visual Closure-Word Fragments pre- to posttest gains showed marked growth change, and these results are compiled in the study's ancillary documents.

However, these two fourth grade classrooms that fell below the norms in achievement also had the lowest pretest baseline percentiles in visual memory speed (4E1-58%, and 4E2-57%) and auditory memory (4E1-55%, 4E2-37%). Five classrooms had lower pretest baseline composites in auditory memory. Beside the two fourth grade classrooms, the other three with lower auditory memory pretest baselines were 5E3 and 8E3 at 52%, and 7E2 at 46% (See Table 7). Although the two fourth grade classes made some gain in the standardized Cognitive Skills subtest, Auditory Memory for Words, and on the CogAT, math achievement was affected and fell below the norms (see tables 4 and 7). Reading achievement gains were evidenced only when pooled.

The 6E1-class, which missed a week's BTA instruction mid program due to the teacher's absence, also received the lowest auditory (listening) .96 mean raw score point gain. The 7E3-class with minimal statistical gains also had lower cognitive skills gains on all four DTLA-2 subtests. The 5E1- and 5E3-classes also missed several days of BTA instruction preparing for a holiday program. Auditory Memory for Words subtest was affected (1.63 and 2.78 pt. gains, respectively). (See Table 7 and Figure 6).

The ITBS-CogAT combined test is designed to predict student cognitive skill aptitude. The CogAT scores can help educators identify strong and weak areas of cognitive functioning for each student. Therefore, instruction can be directed toward students' weak skill areas expediently.

School 1 does not apply the ITBS- CogAT. School 2 began the ITBS-CogAT the year of the study. Therefore, only the 1996-1997 pre-posttest, percentile scores are available at this time (See Table 10). It is noted that the two partially treated fifth and sixth grade experimental classes that are combined with the corresponding control groups for Building Averages, show no cognitive skill gain on the CogAT. The experimental 5E1 and 6E1 classes complied with the executive criterion measures 50% - 70% of the time (See Table 4). Grades 7E1 and 7E2 were also lower on the compliance scale, 40% to 50%, and also showed some decline on cognitive skills as measured by the DTLA-2 (See Table 7).

Discussion.

It was hypothesized that the BTA experimental treatment classrooms would have reading and math gains greater than the control groups' gains, and these gains were achieved regardless of incomplete application.

Evaluation criteria particularly useful to this study were the works of Feuerstein (1988), Meeker (1991,1968), Gardner (1985), and Lozanov (1978). These researchers are cited because of their ability to apply theory to successful practice. This study differs from some projects because harmony was found through merging these complementary theories by selecting viable elements from each, and applying them in an automated media application to expedite training.

The relevant executive criteria were determined by examining longitudinal studies of other successful applications of this investigator's research. In assigning weights to the executive criteria, this researcher drew upon site visit observations, knowledge management of past studies, and established criterion measures. Weights were assigned to each of the executive criterion measures and ranged from two to nine points per criterion based upon cause and effect.

Therefore, a comparison can be made concerning practice and implementation factors. These measures indicate that there are treatment gains if the executive criteria measures are applied 50% of the time or more, verifying Schuster and Gritton's (1986) predictions.

Figure 6.

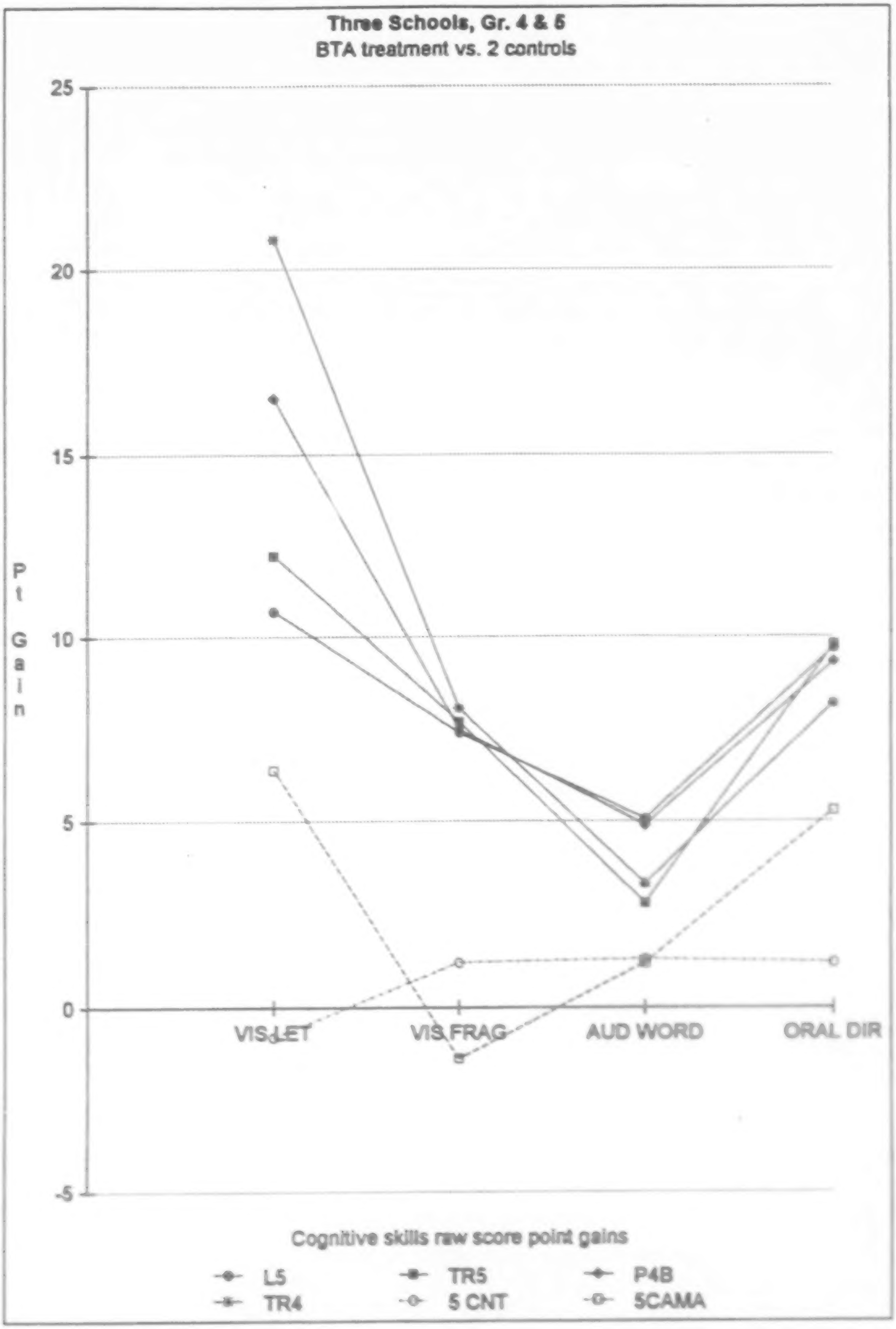
Three Schools, Gr. 4 & 5
BTA treatment vs. 2 controls
25
20
15
10
5
0
-5
Pt Gain
VIS LET
VIS FRAG
AUD WORD
ORAL DIR
Cognitive skills raw score point gains
L5
TR5
P4B
TR4
5 CNT
5CAMA

Table 7. Raw score average gains for 15 classrooms for BTA and control groups pre- to posttest point averages on DTLA-2 cognitive skills tests

Compared to an earlier 1994 field study

	N	IQ Pre-test DTLA-2	IQ Post-test DTLA-2	IQ Point Gain	Baseline WDJ 2 & 7 Visual Speed Pre-test % Entry Level	Baseline WDJ 3 & 10 Auditory Memory Pre-test % Entry Level
4,E3	**16**	**95**	**120**	**25**	**64%**	**67%**
5,E3	27	95	116	21	65%	52%
6,E3	**24**	**110**	**123**	**13**	**66%**	**73%**
7,E3	23	117	130	13	79%	72%
8,E3	18	110	122	12	67%	52%
4,E1	23	98	115	17	58%	55%
4,E2	20	92	119	27	57%	37%
5,E1	25	105	121	16	74%	57%
6,E1	21	107	121	14	NA	NA
7,E1	21	105	125	20	64%	60%
7,E2	23	103	119	16	64%	46%
MEAN				18		
Median Average		105	121	16		
A Previous Study - 1994						
5,E Linc	20	106	130	24	51%	44%
5 Control	26	101	107	6	71%	57%
6 Control	22	Data Not Available				
A Previous Study - 1994						
5 Control	10	98	100	2	81%	70%

4E3 & 6E3 Scores are Larger Font, as they are Top Two Classes Following the Executive Criterion

6E1 WDJ data not available

Cont. on p. 42

	LETTERS 16 Ave Gain Max Pts 67	WORD FRAGMENTS 10 Ave Gain Max Pts 39	AUDITORY WORDS 6 Ave Gain Max Pts 30	ORAL DIRECTIONS 18 Ave. Gain Max Pts 55
4,E3	**20.81**	**8.06**	**3.31**	**8.19**
5,E3	12.22	7.70	2.78	9.78
6,E3	**2.88**	**5.13**	**3.75**	**5.79**
7,E3	6.22	3.52	3.78	2.83
8,E3	8.00	4.00	4.28	2.83
4,E1	12.70	5.13	2.17	7.04
4,E2	16.50	7.50	4.88	9.33
5,E1	14.56	2.48	1.63	7.81
6,E1	8.26	2.83	0.96	7.78
7,E1	16.10	3.48	3.52	5.52
7,E2	9.13	1.26	3.26	5.65
MEAN	11.58	4.64	3.12	6.60
A Previous Study - 1994				
5, E Linc	10.70	7.40	5.05	9.70
5th Control	6.38	-1.38	1.19	5.27
6th Contr	Tests Not Admininstered Correctly: Data Eliminated			
A Previous Study - 1994				
5th Control	-0.80	1.20	1.70	1.20

Table 8

Cognitive skill percentile scores on ITBS-CogAT by grade (two classrooms combined per grade) for School 2.

Building Averages Fall testing	N	Verbal Percentile		Quantitative Percentile		Nonverbal Percentile	
		Pre	Post	Pre	Post	Pre	Post
Grade 4	51	65	67	58	71 *	59	72 *
Grade 5	56	76	75	77	76	83	81
Grade 6	41	77	72	73	72	81	76
Grade 7	46	84	84	74	74	72	73

* Denotes change. Grades 5 and 6 include the two control groups.

The experimental groups had a high success rate over the control groups, who applied nineteen combined Alternate Media Activity (AMA) procedures. The BTA treatment groups had gains equal to or greater than the robust scoring controls in ninety academic subject areas, with significant gains over both the controls and norms in sixty-five.

Vocabulary, a component of the Reading Total, evidenced gains in the classes whose teachers applied the Latin Root lesson prescriptively (4-classes with significant results). Unfortunately, several experimental class teachers eliminated full application of the Latin Root instruction that would have affected the ITBS Vocabulary subtest scores. Some teachers alleged that the eight minutes of Latin Roots daily training was too tedious for the children and arbitrarily eliminated this important instruction.

The Latin Roots lessons proved to be an integral component of the daily encoding-decoding Verbal-Language training in former studies (Erland, 1994,1992, 1989). These previous treatment classes were taught by facilitators who believed in Latin Root instruction, so their students evidenced strong Vocabulary achievement test score gains.

All substitute and control group teachers had the accelerated learning workshop training because the control groups had not been identified at the training onset, before school started. The control group (AMA) classrooms were reminded they could not apply accelerated learning concepts.

Future researchers should carefully monitor the control groups, and not permit the control group teachers or their substitutes to attend the accelerated learning pre-treatment training. This supervision would ensure Quality Assurance practice.

The strong 4E3 gains may be attributed partially to the enthusiastic adoption by the teacher of the Right Brain accelerated learning practices. As a primary grade teacher, she vigorously applied creative teaching applications that she felt would help the class.

Interestingly, it was a substitute teacher, the Kindergarten teacher for that school, who taught this 4E3-class. It is noteworthy that the strongest, most consistent gains occurred in a class taught by a substitute teacher. This suggests that any well-trained teacher can obtain results providing the executive criteria are prescriptively followed.

The regular fourth-grade (4E3) teacher did not participate since she could not attend the BTA accelerated learning training sessions before the school year began. This untrained fourth grade teacher's subsequent years' achievement data became the fourth grade control group. Additionally, this teacher did not have the accelerated learning training, nor did this class receive site supervision.

It is also unfortunate that accelerated learning techniques were most enthusiastically endorsed in primary grades K-4, but are received with less acceptance in middle school. The junior high teachers were more reluctant to apply accelerated learning because they considered creativity, enthusiasm, drama, rhythm, and visualization, to be juvenile practice. The principal concurred with the assumption that creativity is more applicable for the primary grades.

Research shows that good auditory memory (listening) is a key factor to learning, and must integrate with visual memory for conceptualization to result. Auditory memory scores were noticeably affected in this study when BTA application was inconsistent. This incomplete auditory memory development could have possibly translated to fewer classrooms receiving reading comprehension, math, and science achievement increases. If so, this would verify the research of many prominent psychologists, including Guilford (1967), Meeker (1999, 1991, 1969), Reid and Hresko (1981) and Woodcock, (1978).

Regretfully, the classrooms with students with the lowest auditory memory scores, (4E1, 4E2, 5E3, 7E2, 8E3) had implementation shortcomings, which affected their ITBS outcomes. Although the 4E1-class applied most of the accelerated learning strategies, several critical encoding-decoding lessons were removed or taught incorrectly. Consequently, the 4E1-class made only a small two-point auditory memory gain (See Table 9).

The 4E2-class used the accelerated learning strategies, cut fewer of the items and lessons, and implemented only one lesson incorrectly, thus making a more significant five-point Auditory memory gain. However, the students having lower innate cognitive ability levels plus the lack of the encoding-decoding practice could have affected the test-taking ability on the ITBS, creating the retardant effect of the 4E1 and 4E2 classes' falling below the ITBS norms in achievement (See Table 2). Yet, interestingly, these two fourth grade classes were the only School 2 classes that received cognitive skill growth on the CogAT in all three psychological domains of Verbal, Quantitative and Figural (See Table 8). It can be speculated if the accelerated learning techniques could have created this effect.

As the ITBS-CogAT is designed to do, cognitive skills testing offers schools a blueprint for measuring student aptitudes, learning requirements, and prescriptive methods for students within each classroom. Testing and measurement of cognitive skills can also offer schools an efficient way to identify and train remedial students in the regular classroom.

However, the two low auditory ability fourth grade classes, 4E1 and 4E2, when pooled with the strong 4E3-class, had statistically significant gains in the eight subtests of: Vocabulary, Reading Comprehension, Reading Total, Math Total, Language Total, Core Total, Science, and Spelling. This shows important trending toward potential academic achievement. These fourth grade students may show future ITBS achievement test gains as the cognitive skills improvement becomes synthesized the following year.

The other lower auditory memory classes (5E3, 7E2, and 8E3) with implementation shortcomings, eliminated some accelerated learning components, and therefore made fewer achievement gains.

The 6E1-classroom, which stopped the experimental treatment for one-week mid-program due to the teacher's absence, and also applied the treatment for only three out of the five required instructional days, received only .96 raw score points in auditory memory (See Table 7). Unfortunately this is the lowest auditory memory score gain of the thirteen participating classrooms. Clearly, auditory memory improvement, the cognitive skill needed for reading comprehension, math, foreign language absorption, and learning technical information, is directly affected by missed days of BTA-AL instruction.

Accelerated learning (AL) techniques and The Bridge To Achievement (The BTA) are most effective if taught according to scientific prescription to obtain optimum student academic achievement results. Required lessons, items, and number of prescribed days should be instructed according to time and task, scope and sequence.

The essential additional component was the recognition of actual implementation problems and resulting outcome discrepancies. These irregularities were a product not of policy design but of the realities of the implementation. Yet, without these implementation problems, obtaining a clearer understanding of the causal relationships herein would be considerably more speculative.

The layers of causes and effects of correct administration of program policy and outcome results were carefully analyzed. The incorporation of longitudinal data analysis was critical to the sorting of various criteria. There is a strong correlation between following accelerated learning principles and outcome.

This study's implementation problems are not an isolated occurrence. Foundation, school district, state education administrators, and market analysts from different geographical regions expressed concern of teacher reluctance to adopt new paradigms requiring teacher training, instructional time, and effort. The application of new media technologies can sometimes be an intimidating addition to the conventional classroom where teachers are already burdened with learning and behavior problems.

It is fortuitous for the study that the 7E3-classroom teacher used the BTA worksheets and played the BTA video and audio-tapes, but did not apply the accelerated learning methodology, thinking it inappropriate. This indicates that the results dwell not within the curriculum materials per se, but are dependent upon a prescriptively applied system of accelerated learning techniques. In other words, simply handing out the BTA worksheets will not foster results.

Implications for Future Research.

Essential factors that lead to successful implementation of an accelerated learning project should be identified. Several practical questions are raised. Can the typical teacher manage fourteen to nineteen accelerated learning criteria measures? Which of the accelerated learning components carry the most weight and should be consistently applied? How many days of teacher training in accelerated learning methodology are enough to create enthusiastic acceptance and interest?

If poor implementation can still obtain some results, electronic application could possibly regulate learning more optimally. The three factors of teacher mindset, implementation capabilities, and high expectations of positive outcome, would be best accomplished by a system of controlled, automated, easy-to-apply educational tools.

This accelerated learning study should be replicated with additional classrooms, grades 4-12, with interactive media instruction. Accelerated learning strategies and methodology, such as those used in this study, can be applied to school curriculums. Additionally, university research, with foundation partnerships, could determine how accelerated learning methods can be adapted to help more students learn effectively to meet the demands of the next century.

Conclusion.

The results of this study indicate that the BTA-AL learning tool would be best if applied again a second time in the following semester when the cognitive test scores revealed a class mean of less than 40th percentile rank in either visual or auditory memory. Therefore, specific gains would not have to be extrapolated between school years, as gains would be consistent. Lower achieving students would receive that important second session that has been shown valuable in earlier studies (Erland 1994, 1992, and 1989a). Additionally, since students enjoy the puppet practice exercises, they could expand the training and solidify their auditory memory needed for achievement in reading, math, and science. Since auditory memory proficiency is fragile, consideration should be given to subsequent yearly booster lesson review.

Moreover, video taping would serve as a tool for duplicating the program successfully so upcoming classes could continue to obtain positive results. Future studies should incorporate videotaping of the accelerated learning classroom instruction to aid instructional evaluation. Videotapes become a valuable instructional index because they serve as a training reference for teachers, administrators, and evaluators.

Several additional questions remain unanswered. Can the publishers of the nineteen sets of instructional materials used by the control groups combine these sets into one viable teaching tool? How much effect did the control groups' record of forty-eight implementation days have on their outcome results? Did accelerated learning training leak into the control groups' Alternate Media Activity (AMA) instruction?

The wide range of solid results for the experimental classes demonstrates the strength and viability of accelerated learning. The obvious success of both the experimentals and controls with interactive media activities validates this type of automated instruction.

A follow-up report documenting that these gains maintained longitudinally is in publication process.

Acknowledgments:

To Dr. Donald H. Schuster, Psychology Professor Emeritus, Iowa State University, for his friendship, support, and interest in perpetuating the works of accelerated learning, and those of his mentor and USC advisor, the late Dr. J. P. Guilford. Special appreciation is expressed to Dr. Schuster for his advising, advanced qualitative and quantitative analysis, APA style copy editing, and technical quality assurance in this work.

To Thomas Jud Stanion, University of Kansas Pre-Law and Economics Graduate Student, Mem-ExSpan Administrative Assistant, volunteer, accountant, analyst, and technical editor. For his work with the data compilation, contextual qualitative and quantitative analysis, table methodology and progression, technical editing, and quality assurance.

To Stefani K. Janssen, University of Kansas Accounting and Pre-Law Student, Mem-ExSpan staff assistant and volunteer, accountant, and technical editor. For her work with the data compilation, technical editing, presentation design, table formatting, and quality assurance.

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Journal of Accelerated Learning and Teaching
Volume 23, Issue 3 & 4 Fall, 1998

Reducing Test Anxiety by a Combination of Hypnosis and NLP

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ABSTRACT

Combining the "theatre" and the "collapsing of anchors," two Neuro-Linguistic Programming techniques, which have proven to be therapeutically effective, forges a particularly potent change methodology. When the combination technique is also embedded within the framework of a hypnotic induction designed to increase patient expectancy of success, it is able to stimulate positive change very powerfully. A case study of a student suffering extreme examination anxiety provides an illustration of this power, particularly as only a single therapy session was used to achieve the desired improvement.

INTRODUCTION.

In a recent edition of the Journal of Accelerative Learning and Teaching, attention was drawn to the value of two NLP techniques, "the theatre," (Stanton, 1994) and "collapsing of anchors" (Tye, 1994). Though both of these techniques are very effective in their own right, I have found that they become even more powerful when used in combination. This is particularly so when the combination is embedded within the context of a hypnotic induction designed to arouse patients' expectancy of successful treatment.

The way in which this combined technique might be used is illustrated with the case study of Robert, a 14 year old high school student who experienced a degree of examination anxiety that was almost paralyzing. Most teachers are very aware that a surprisingly large number of students suffer from this problem. Should the anxiety level be of moderate intensity, it may actually enhance performance. However, higher levels are likely to inhibit examination success (Allen, 1980).

Experimental results demonstrate that, when ability level is held constant, test-anxious students achieve lower academic grades than their less anxious peers (e.g., Hill, 1884). This finding, that such students do not record test performances comparable with other indices of their academic ability and knowledge, appears to hold for children and adults alike (Deffenbacher & Kemper, 1974).

Robert's case was more extreme that the average in that he virtually 'froze' in the examination room, often being unable to write more than a sentence or two. This was not because of lack of knowledge, for his other work was of a very high standard. Fortunately he responded very positively to the combined method which occupied a single 50-minute session only. Although this may seem a very short period in which to handle such a problem, Talmon (1990) has indicated that single session therapy can be extremely effective. Other studies (e.g., Jones & Vischi, 1979: Mumford, Schleisinger & Glass, 1984) provide support for Talmon's finding in their conclusion that length of treatment does not proportionally enhance therapeutic benefits.

THE COMBINED TECHNIQUE.

The Theatre

This technique, which I have modified slightly, derives from the work of Bandler [1985] who has emphasized the power of mental imagery in helping patients quickly overcome their problems. The following steps detail how Bandler uses both imagery and disassociation to promote change:

[i] Patients are to imagine that they are sitting in the middle of a movie theatre. On the screen before them, they are to see a black-and-white snapshot of themselves in a situation just before they had a particular undesired response.

[ii] They then float out of their bodies up to the projection booth of the theatre, where they can "watch themselves watching themselves." From that position they are able to see themselves sitting in the middle of the theatre, and also see themselves in the still picture, which is on the screen. Because of the distance involved, this picture will be quite small.

[iii] That snapshot up on the screen is then transformed into a black-and-white movie, this being watched from the beginning until just beyond the end of the unpleasant experience.

[iv] When patients reach this end point, they are to stop the movie, make it into a slide and turn it into color. They then come down from the projection box, jump inside the picture, now large and colorful, and run it backwards to the original starting point as a movie. This should be done quite rapidly, taking only a few seconds. Everything is to take place in reverse with people walking and talking backwards. In addition, a comic sound track might be added together with anything else likely to create a sense of the ridiculous.

[v] In my own use of the technique, I have added a fifth step in which the color movie is then run forwards again, this time with events transpiring in the way the patient would have liked them to have occurred. Once this step has been completed, patients imagine themselves stepping out of the picture into the self in the picture theatre. After this reintegration, patients

return to the reality of the therapy room.

Bandler argues that while the brain learns fear instantly, it also can learn, instantly, that it is no longer necessary to be fearful. Because the initially frightening experience looks so ludicrous when visualized in reverse, patients often lose their phobic response. As patients change their perceptions in this way, they come to a realization that they have more control over their thoughts, and, ultimately, over their lives, than they had previously believed possible.

Collapsing of anchors.

This second technique (Bandler & Grinder, 1979) begins with identifying the response patients wish to change. Once they have done so, they sit with closed eyes, recreating the unpleasant feelings associated with the unwanted behavior pattern. Usually they reveal that they are experiencing such feelings through facial changes or altered breathing rhythm, although a verbal indication may also be given. The unpleasant feeling may be "anchored" verbally by a change in voice tone or volume, or non-verbally, perhaps by a touch on the right wrist. The therapist can then recreate the negative situation within the patient by a repetition of that particular "anchor".

Patients proceed to explore their experience in order to discover what resource they now possess which could be "taken back" into the past to change the unpleasant feelings. This resource might be increased confidence, trust, maturity, or relaxation, attributes patients now have which were not present in the initial, negative situation. One way of helping patients identify such resources is to encourage them to think of a relatively recent experience which they handled in a mature, effective, successful manner.

Should patients be unable to find a resource, which, if applied to the original, unpleasant situation, would have produced a more acceptable outcome, they are asked to imagine how an admired person may have handled the situation. This usually produces the desired positive feelings. As patients' faces and breathing reflect these feelings, the resource is "anchored", perhaps, with a touch on the right elbow.

In a third step, the therapist touches the first "anchor" to recreate the unpleasant situation. As patients experience this, the therapist touches the second "anchor", bringing in the positive feelings of the resource. Patients, resting with eyes closed, take as long as is necessary for the unpleasant feelings to change under the influence of the positive resource. And change they usually do. Patients feel and "see" themselves responding differently, successfully, thus creating a new history.

The process is then generalized to other situations patients are likely to encounter in the future. The therapist says: "In the future, anytime you experience anything similar to your previous unpleasant situation, you will feel this (touching the resource "anchor")." Control can be passed to patients by having them trigger the anchor and generate their own positive state.

Hypnotic induction.

The type of induction used is not critical (Stanton, 1975). Of more importance is the therapist's indication that, through the use of an induction, patients will be able to accept positive suggestions more deeply than would otherwise be the case and thus be more likely to achieve their desired therapeutic goals. By engaging patient expectation of success in this way the therapist makes powerful use of the placebo effect. As Oyle (1975) has expressed it:

> "...some patients decide that only the proper herbs can heal while others put childlike faith in the power of the pill; still others insist that salvation can only be achieved by mastering a particular yoga position or by repeating a mantra. *Whatever you put your trust in can be the precipitating agent.for your cure.*" (p.25).

Thus if patients believe that, through experiencing a hypnotic induction, they will respond more positively to the treatment offered, that is what is likely to occur.

One hypnotic induction method I have found particularly effective in this context is to have patients relax into a very comfortable area within their bodies, experience the spread of this comfort to all parts of their bodies, and allow these areas to relax as they think about them. This approach is, to some extent, a variant on Jacobson's well known progressive relaxation technique (1938) and is the one I used with Robert in the following case study.

A CASE OF TEST ANXIETY.

Robert sought help with the test anxiety problem described at the beginning of this article. Through a number of negative experiences in the examination room, he lacked all confidence in his ability to do himself justice in this situation. Although his on-going assignment work had carried him so far, adequate performances on examinations had now become essential for Robert's continued progress through school.

Robert was able to identify one particular examination, which seemed to be the start of his problems. Two years previously, as a 12 year old, he had been surprised by an unannounced classroom test. On earlier occasions he had handled such tests reasonably well. However, these had always been announced in advance and, as a conscientious student, he had prepared himself by studying the material to be tested. Because this particular test was quite unexpected, Robert, a boy lacking in self-confidence, panicked and wrote wildly incorrect answers. The test was then marked as a class exercise with an insensitive teacher using some of these answers as examples of 'schoolboy howlers', embarrassing Robert greatly. This incident provided eminently suitable material as a starting point for the composite technique as Robert's performance in any form of test deteriorated markedly from that time.

To raise his expectancy of success, I explained how a hypnotic state would help him find a way of overcoming his examination anxiety. In order to attain this state he could go inside his body to find some area that felt extremely comfortable, possibly the most comfortable part of his whole body. Into this part he would be able to relax and as he did so, the unconscious part of his mind would do everything necessary to spread that comfort and relaxation through his whole body. As this was happening, any part of his body he chose to think about would "let go". In this way he traversed key areas of his body allowing them to relax. It was suggested this relaxation would continue as he followed his breath in and out, "letting go" more and more with each out-breath.

Robert then imagined himself entering the theatre, sitting down, and seeing himself on the screen just before he heard his teacher say that they were having the previously unannounced test. He then "floated" up to the projection box from where he could look down, simultaneously seeing himself in the theatre and this black-and-white slide of the classroom on the screen. Because of his distance from the screen, the slide was now quite small, as was the black-and-white movie of the traumatic episode, which Robert now viewed. He stopped this as a slide at the point when he left the classroom for the lunchtime break. As he viewed this movie, I maintained a touch on his right wrist.

Mentally descending from the projection box, Robert then entered the picture of himself on the screen, turned it into color, and, as a movie, ran it backwards to the starting point, adding as much humor as possible. This time I maintained a touch on his right elbow. I continued to hold this anchor as he ran the movie forward once again, this time creating an entirely different scenario of a highly successful test performance, one, which gave him feeling of great confidence. As Robert enjoyed this experience I had him replace my fingers on his right elbow with his own, suggesting that, in future, on any occasion he wished to re-experience this confident feeling, he would be able to do so by triggering this anchor. I also suggested that every time he used the touch on the right elbow anchor, the more powerful it would become in generating this confidence.

As Robert sat quietly in the theatre, the screen now blank, I triggered first the negative wrist anchor, then the positive elbow anchor, collapsing these so that the latter replaced the former. Robert confirmed verbally that this had, in fact, occurred.

CONCLUSION.

In the treatment I have described in this article, use of a "hypnotic" induction is not mandatory. As I have previously indicated (Stanton, 1975), the use of such an induction is not essential to the production of change in people who are exposed to positive suggestion. However, because so many people believe so strongly in the power of hypnosis, the therapist, through the induction, makes use of this expectation and may appreciably increase the effectiveness of his intervention. If students expect to be helped, this belief greatly enhances the possibility of this result being forthcoming. We tend to get what we expect (Rosentahl & Jacobson, 1968) and there exists widespread belief in the magical properties of hypnotism. There is the expectation, engendered primarily through stage performances, movies and television, that hypnosis is a fantastically powerful tool for effecting change in people. Thus, when exposed to a hypnotic induction, students anticipate dramatic improvement. By embedding the two NLP techniques within such a context, their power to effect change is likely to be enhanced.

The theatre, by employing the double dissociation of having students visualize themselves in the audience and in the projection box, enables them to view, in a detached way, a previously anxiety-provoking situation without experiencing the intensity of feeling it had previously evoked. This sense of remoteness, of detachment, helps them modify the fear they had previously been attaching to the incident.

Many users of this approach comment that visualizing the events of the initially frightening incidents in the running backwards mode drains away much of the negative emotion they previously evoked. It all becomes somewhat ludicrous. Robert certainly found this to be so, for his examination results improved quite markedly. However, the improvement was not limited only to this area. As his confidence improved, he engaged in, with considerable success, a number of activities, which he had previously been too self-conscious to attempt.

Because this combination therapy draws so heavily upon a student's visualization abilities, it might be argued that its use is limited to those who are able to use their imagination in this way. This was an issue, which once concerned me with many of my therapeutic techniques. Experience has shown, however, that when people say they are unable to "see" whatever is suggested, if they are asked to act as-if they could do so, the difficulty seems to disappear.

A more valid limitation is that of identification of a critical incident. Robert was aware of the experience, which created his test anxiety problem. However, should a student be unable to identify at least one such incident, the combination technique would not be applicable. Since such cases are relatively rare, the approach I have outlined in this article is likely to help many students overcome their anxiety in the examination situation.

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Sources of reference information on accelerated learning

The easiest access to published information on accelerative (-ed) learning, SALT, suggestopedia, and Super Learning is through the ERIC system available in many university and college libraries. Secondary sources are *Dissertation Abstracts* and *Psychological Abstracts* along with the periodic author and topic indices of the *Journal of Accelerative Learning and Teaching*. Chapter 3 of *Suggestive Accelerative Learning Techniques* (1986) by Schuster and Gritton [University of Toronto Press] has an extensive review of the literature then available.

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1978, 3(1):181721; 3(2): 181722; 3(3): 202238; 3(4): 191282
1979, 4(1): 192560; 4(2): 193944; 4(3): 193945; 4(4): 362044/FLO21508
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1981, 6(1) to 6(4): all in 258461 [4/6 fiches]
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1994, 19(1) to 19(4): ED386019/ FL022834 [5 fiches]
1995, 20(1) to 20(4): not available yet as of 4-14-96

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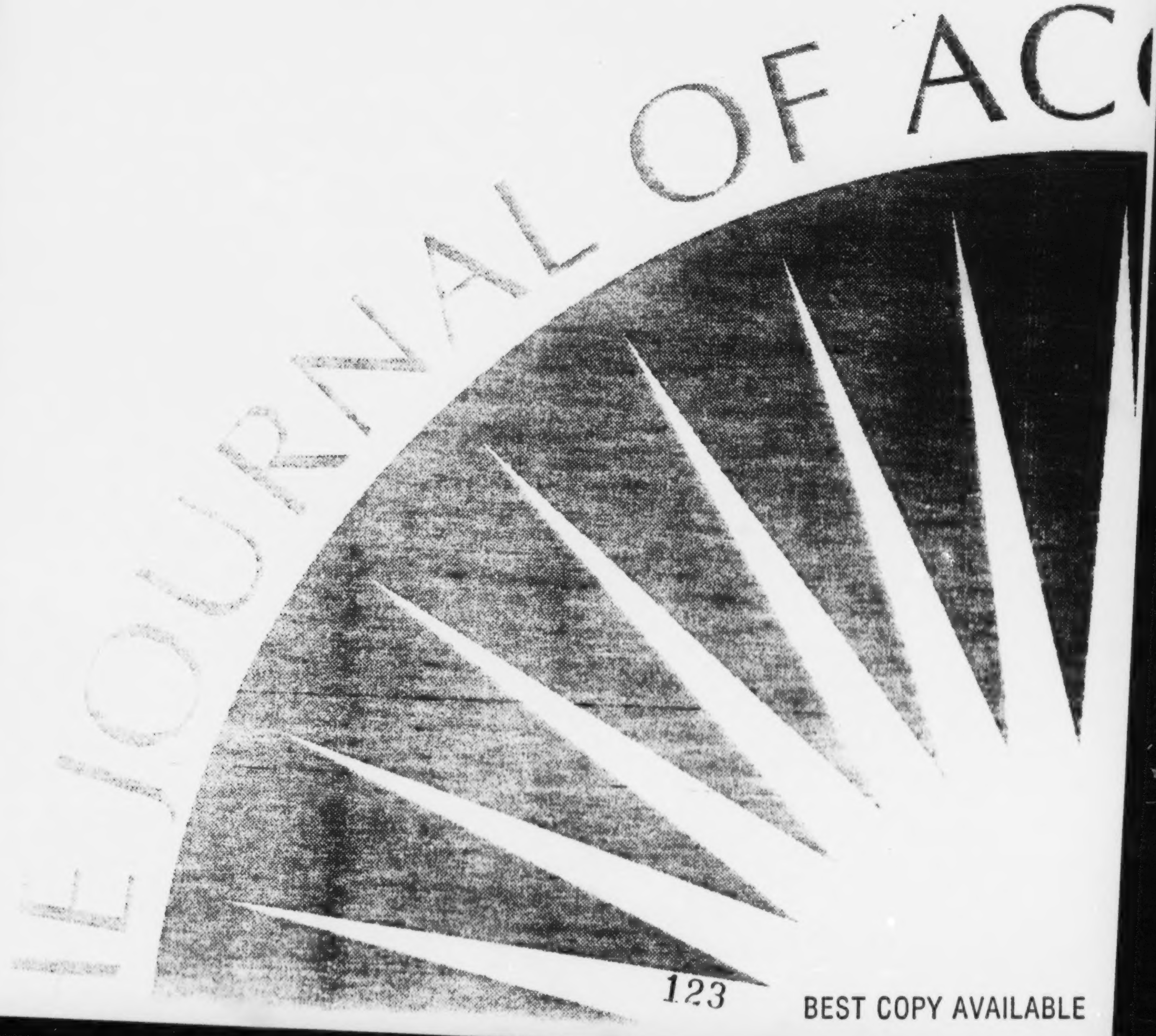
The Library of Congress has assigned these two international Standard Serial Numbers to JSALT:

ISSN 0272-622X: Journal of Suggestive Accelerative Learning and Teaching, Volumes 1-4.

ISSN 0273-2459: Journal of the Society for Accelerative Learning and Teaching, Volumes 5 to 20.



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